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**Elkhorn Coral (*Acropora palmata*)**  
Photo: NOAA  
(See related article on page 36)

Formerly *Aquatic Vet News*

Volume 7, Number 1  
First Quarter, 2013



# THE AQUATIC VETERINARIAN

Volume 7, Number 1

Formerly *Aquatic Vet News*

First Quarter 2013

WORLD AQUATIC VETERINARY MEDICAL ASSOCIATION

## WHO ARE WE

**The mission** of the World Aquatic Veterinary Medical Association is to serve the discipline of aquatic veterinary medicine in enhancing aquatic animal health and welfare, public health, and seafood safety, in support of the veterinary profession, aquatic animal owners and industries, and other stakeholders.

**The purpose** of the World Aquatic Veterinary Medical Association is:

- To serve aquatic veterinary medicine practitioners of many disciplines and backgrounds by developing programs to support and promote our members, and the aquatic species and industries that they serve.
- To identify, foster and strengthen professional interactions among aquatic medical practitioners and other organizations around the world.
- To be an advocate for, develop guidance on, and promote the advancement of the science, ethics and professional aspects of aquatic animal medicine within the veterinary profession and a wider audience.
- To optimally position and advance the discipline of aquatic veterinary medicine, and support the practice of aquatic veterinary medicine in all countries.

*The ideas presented in this publication express the views and opinions of the authors, may not reflect the view of WAVMA, and should not be implied as WAVMA recommendations or endorsements unless explicitly stated. Information related to the practice of veterinary medicine should only be used within an established valid Veterinarian-Patient-Client Relationship.*



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Dr Hugh Mitchell (USA) 2009

Dr Fotini Athanassopoulou (Greece) 2010

Dr Julius Tepper (USA) 2011

Dr Dusan Palic (USA/Germany) 2012

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**Please send articles, clinical reports, or news items to the editor by the following submission dates:**

- Issue 1 – February 15 (published in March)
- Issue 2 – May 15 (published in June)
- Issue 3 – August 15 (published in September)
- Issue 4 – November 15 (published in December)

All submissions should be in 10-point Arial font, single spaced.

Submissions may be edited to fit the space available.

[See page 11 for further instructions to authors.](#)



# THE AQUATIC VETERINARIAN

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EDITORIALS

First Quarter 2013

## Editor's Note

Hopefully you have noticed the significant changes in this issue of the World Aquatic Veterinary Medical Association newsletter—formally the *Aquatic Vet News*—and now titled *The Aquatic Veterinarian*. Along with the name change, there is a format change, and we are pleased to include two peer-reviewed items in this issue: an original research article by Laura Urdes and a clinical case report submitted by Wadim Kapulkin. This is a great start to our revised format and we encourage all of our readers to provide feedback.

We hope you like the new format, and hope to expand the peer-reviewed articles in each issue. Please send me your articles if you would like to contribute to *The Aquatic Veterinarian*. Even if you don't have an article or case report to contribute, please send me interesting news items to include in our News and Views section, including the original source of the item.

In order for this publication to be successful, we need consistent help to obtain material. Even if you only submit information from other sources that you found to be interesting or useful in your veterinary practice, that will help our other members as well. If you would like to be a regular contributor, we will add your name to our Editorial Staff.

Please let me know if you are interested!

Nick Saint-Erne  
[Saint-Erne@Q.com](mailto:Saint-Erne@Q.com)  
Editor

Next to fish, my favorite pets are tortoises. Below are some of my many tortoises:  
1 Leopard tortoise,  
4 Sulcata tortoises,  
2 Desert tortoises.



## 2013 WAVMA Programs

Once again, this year's WAVMA Program has a strong educational theme with WAVMA being involved in organization or providing content for five meetings:

**Aquaculture America 2013**,  
Nashville, Tennessee. February 21 - 25.

**Aquaculture Insurance Risk Management Conference**. Istanbul. April 4 - 5

**AVMA Convention**  
Chicago, Illinois. 19 - 23 July

**World Veterinary Congress**  
Prague. September 17 - 20 September

**International Aquaculture Biosecurity Conference**. Munich. 25 - 27 September

Additionally WAVMA Board members will attend the WSAVA Congress, FVS Scientific Meeting, SAVMA Convention and EAFP Conference, amongst others.

## Cover Photo:



Elkhorn Coral (*Acropora palmata*)

Photo: NOAA

[See related article on Page 36](#)

# THE AQUATIC VETERINARIAN

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EXECUTIVE REPORTS

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## President's Report

It is my great honor to serve as the President of this unique international organization of aquatic veterinary medicine. I am humbled by the outstanding work done by previous Presidents, Board Members, and committees of WAVMA. However, I assure you that I will do my best to rise to the challenges that face our profession through work with the distinguished members of our 2013 Board, stakeholders, and all of you.

In 2012, WAVMA continued its worldwide expansion and several milestones have already been achieved. 2013 will witness not only the completion of these programs, but also their implementation. The success of our field depends on the balance of conservation, aquaculture, and aquarium medicine, and WAVMA must continue to behest and guide their integration. This year I am fortunate to be working with five internationally renowned WAVMA fellows. I count on our esteemed fellows to develop long-term plans for all the scientific activities of WAVMA. I encourage all of our members to nominate potential fellows for 2013 to enrich our activities and to rise to the next level.

The Credentialing Committee recently completed the Certified Aquatic Veterinary Practitioner Program that will recognize our members who have met the necessary credentials as aquatic veterinary practitioners. The Credentialing Committee identified the knowledge, skills, and education needed to earn the certification. As an initial phase, the Credentialing Committee is fine tuning the process before accepting applications from members.

The WAVMA newsletter, *Aquatic Vet News*, has been instrumental in binding us together, directing our attention to major relevant events, capturing trails of member discussions, and giving us synopses of the aquatic veterinary activities worldwide. Working with the newsletter editor, Dr. Nick Saint-Erne, we are upgrading from a newsletter and progressing toward more of a journal format, changing the title to *The Aquatic Veterinarian*, and adding a section for peer-reviewed publications. You are all invited to be contributors and reviewers in this effort and to bring this publication to be the premier newsletter for aquatic veterinarians.

Membership brings many other benefits including discounts on books and webinars, access to scholarships, and Livedrive unlimited cloud computer back-up allowing access and sharing your documents on any computer, tablet or smartphone.

WAVMA membership means being part of the largest aquatic veterinary association, which actively strives to achieve its Mission Statement. Additionally, with the new programs introduced for 2013, your membership dues could save you well over \$600 annually in member discounts and services.

WAVMA is also an Affiliate member of the World Small Animal Veterinary Association (WSAVA) and an Associate member of the World Veterinary Association (WVA).

I feel very privileged to serve you in 2013 and be guided by your comments, suggestions, and criticisms. WAVMA will continue to flourish by implementing your ideas. Please contact me at any time by email ([fishdoconline@gmail.com](mailto:fishdoconline@gmail.com) or [faisal@cvm.msu.edu](mailto:faisal@cvm.msu.edu)) or on my cell phone (001-517-899-5433). Last but not least, I would like to thank last year's President, Professor Dušan Palić for his diligent work in 2012, despite his back and forth moves across the Atlantic Ocean, and Past-President Dr. Julius Tepper who has continued to be a great help for WAVMA. I am also excited to work with our President-Elect Dr. Richmond Loh, who is bringing a new spark from Oceania.

I am very proud of these accomplishments, which will take us all to new frontiers. I am counting on each and every one of you to guide us as we embark on the next chapter of WAVMA and our profession. Together we will continue to prepare WAVMA to set the standard for aquatic veterinarians in the new millennium. Please join our efforts.

**Mohamed Faisal, DVM, PhD. Doc. Honoris Causa**  
2013 WAVMA President  
SF Sniieszko Endowed Scholar and Professor of  
Aquatic Animal Medicine  
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## Secretary's Report

Outside our conservatory there is an old bul-lace tree, a type of wild plum. It produces a few sour yellow fruits in the autumn, provides shade for the conservatory during the summer, but possibly its most effective role is it provides a good estimate of how mild or hard the previous winter has been based on the date it blossoms. The earliest date I have recorded in the last twenty years is February 6<sup>th</sup> and this year despite it being the first week of March I am still waiting. I expect it will blossom in the next week or so, but this is still unusually late. Yet, without this reference I would have suggested that the winter had been pretty average here in the UK.

Now I accept that basing an opinion on the evidence of one tree is probably rather suspect, although it seems highly relevant to our own local micro-climate, and it is probably more reliable evidence than my personal perception of winters past, but one thing we humans seem to do frequently is make decisions based on limited evidence, personal experience, and perhaps our own aspirations. It is only through processes such as science, which might be described as the elucidation, examination and dissemination of facts that we can see the full picture. Key to this is communication of those facts, but communication can be fraught with difficulty and misunderstanding, particularly when the same message is meant for diverse global audiences. Often the message needs to be repeated, communicated through different media, simplified, expanded or adapted to local needs.

During the formation of WAVMA, discussion clearly identified a need to promote aquatic veterinary medicine which is reflected in the [Mission Statement](#). It was also apparent that the wants and needs of individuals varied depending on region or locality. This was reflected in a desire for WAVMA to act as an international umbrella organisation and this desire is contained within the [Bylaws](#), which allow the inclusion of other veterinary groups or the formation of national, regional or discipline specific chapters. Whilst this provides a *raison d'être* for WAVMA it is not particularly appealing for an individual who is more concerned with local issues and what affects them on a daily basis, and without members no organisation can exist. Because aquatic veterinary medicine is so fragmented, WAVMA needs

to attract individuals, since there are only a few veterinary organisations which cater specifically to the aquatic vet and no other that can really claim to be international. This complicates communication even further as any message has to achieve two basic aims amongst others, appeal to the individual whilst promoting/portraying WAVMA as an umbrella organisation, something which is particularly hard to combine. Has WAVMA proven that it can appeal to the individual whilst providing the services required of an umbrella organisation? It is this question I would like to address in the rest of this Secretary's Report by looking at WAVMA activities and developments over the last quarter.

Multiple types of media are used by WAVMA to communicate to members and non-members. The [website](#) has had new pages added and pages updated this quarter. Looking at the cluster map at the bottom of the home page WAVMA has certainly garnered global interest. Additionally WAVMA has [Facebook](#) and [LinkedIn](#) pages as well as a [NOVICE](#) group. It publishes the [Aquatic Vet News](#) quarterly which has a face lift this edition and a name change to *The Aquatic Veterinarian* as WAVMA progresses towards producing a future international peer-reviewed journal. Add the website [e-news and archive](#), along with the Members and Students listserv that always have lively and informative discussions and it certainly feels as if communication should not be a problem. But I wonder what percentage of members actually use, contribute to, or are aware of these various sources of information? If you were unaware of any of them, then please take the time to look at them now and consider how they can be improved or how you might contribute.

Is WAVMA fulfilling its mission statement and can it fulfill its role as an umbrella organisation? WAVMA certainly has the largest membership of any uniquely aquatic veterinary organisation, so it would seem on an individual basis it is relevant, but is this based on pertinence or that in some places there is no alternative? As an umbrella organisation the facts would appear mixed, with WAVMA appearing to be doing a good job of promoting aquatic veterinarians to non-aquatic veterinary organisations and to those outside the profession, which has to benefit WAVMA members, but making slow progress in interesting other aquatic veterinary organisations in joining as Allied Veterinary Organisations (AVO), which diminishes the cohesiveness, impact, and development of our unique veterinary discipline.



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The good news is that the Australian & New Zealand College of Veterinary Scientists ([ANZCVS](#)) Aquatic Animal Health Chapter has now joined as an AVO providing additional benefits to their members and WAVMA, whilst helping to publicise their Fellowship program, which is equivalent to Board Certification in the USA, and is open to any veterinarian around the world. This quarter we also saw the formation of the first [student chapter](#) at Tuskegee University in Massachusetts and progress towards the same at UPEI in Canada, as well as discussions on setting up a Nigerian Chapter. Perhaps the message is finally getting across regarding the benefits of allying with WAVMA?

WAVMA is continuing to promote aquatic veterinary medicine both within and without the profession. WAVMA has been asked to provide a presentation on biosecurity at the Aquaculture Insurance Risk Management Conference ([AIRM](#)) allowing WAVMA to illustrate to the insurance industry the benefits of using veterinarians and has also been asked by the World Veterinary Association to provide a presentation on fish welfare during the Global Veterinary Welfare Seminar to be held during the [World Veterinary Congress](#). Recently, WAVMA held for the second year a series of presentations during Aquaculture America and has started a dialogue to encourage the [WSAVA](#) to include ornamental fish medicine as part of their [Congress](#) in Cape Town during 2014. Additional promotional activities include WAVMA partnering with NOVICE as it develops and as a partner in the 3<sup>rd</sup> International Aquaculture Biosecurity Conference later this year (to be held in Munich straight after the WVC in Prague).

Perhaps of more use on a daily basis is that this quarter has seen the first cohort start the process for certification as an Aquatic Veterinary Practitioner (Cert-AqVP) to ensure there are no bugs in the system before making it generally available. This process is aimed at demonstrating day-one competence as an aquatic veterinary practitioner and will provide global recognition. Members may wonder why WAVMA did not develop something akin to Board Certification. There are several reasons for this; a few years ago it was looked at under the European Colleges system but it was clear that it would take at least five years to develop, that there is already a suitable qualification available through ANZCVS and that the cost and time required for a member to achieve it would make it not particularly relevant to the majority of WAVMA's members. Rightly or

wrongly there seemed little point in reinventing the wheel and better use of resources could be achieved by development of WAVMA WebCEPD and other member benefits. Speaking of which, WAVMA will hold its second webinar during mid-March on the Nitrogen Cycle and can now provide members with discounted [Livedrive](#) subscriptions. By the time you read this report you should have received further information on both of these projects through the members listserv.

I apologise for a rather long report but hope it demonstrates what the Board and others have been up to this past quarter, the hard work that these people continue to do on your behalf and some of the benefits to come through membership and supporting WAVMA. I hope it proves that WAVMA appeals to individuals and can act as an umbrella organisation. If not, I would encourage you to contact any member of the Board with your opinion or suggest something through the listserv. Communication is a two way process and if you do not let the Board know of your wishes or needs then it cannot respond. WAVMA is your association.

**Chris Walster**, BVMS, M MPH  
WAVMA Secretary  
[Secretary@wavma.org](mailto:Secretary@wavma.org)



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EXECUTIVE REPORTS

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## Treasurer's Annual Report for 2012

WAVMA members may be interested in the financial health of our organization. The following chart shows the budget for last year and the actual income generated (below) and expenses paid (next page). The good news is that WAVMA is very stable, and has increased its reserves year over year.

The money generated by WAVMA activities is mainly from membership dues, but also from proceeds from conferences put on by WAVMA members. This income is used to pay our dues to WSAVA and WVC, to pay for the website development and hosting, meeting expenses, bank fees, and other items shown in the chart. For 2013 we have negotiated a slightly lower credit card fee rate with the bank and we will save a little bit on that.

New sources of revenue for WAVMA include online seminars (webinars), selling merchandise (shirts, decals, books) on our website, and income from education meetings. With this income we can offer further benefits to our members. Examples

might be free participation in the webinars for members, discounts on books offered, and a great one for 2013 is Livedrive computer back-up. In the past year I have had my PC crash, plus my laptop, my wife's PC and laptop, two of my daughter's laptops, and my back-up hard drive crash. Fortunately I was able to save all of the data on the computers, but not without expenses well over \$1500! With Livedrive, your computer is automatically backed up online and is accessible from anywhere with your security code. You will never lose any data again! This is just one of many benefits for being a WAVMA member.

The year 2013 is starting off great, with many new WAVMA members and lots of programs scheduled for the year. Your Executive Board is working hard to make this organization great, and we are using the money wisely to build a better organization.

**Nick Saint-Erne**

[Treasurer@WAVMA.org](mailto:Treasurer@WAVMA.org)

### 2012 Budget

World Aquatic Veterinary Medical Association

as of 12/31/2012

				Beginning Bank Balance: \$10692.25
SUMMARY	ACTUAL	BUDGETED		
			Ending Bank Balance:	\$9094.33
Total income	20,520.00	20,510.00	Balance in England:	\$1926.09
Total expenses	20,191.83	25,663.00	Total Cash Assets:	\$11,020.42
<b>Income less expenses:</b>	328.17	-5,153.00	<b>Net change from 2011 =</b>	<b>\$328.17</b>

INCOME DETAILS	ACTUAL	BUDGETED	NOTES
Veterinary Memberships	8,700.00	8,000.00	87 Full Members paid dues in 2012
Student Memberships	1,350.00	900.00	54 Students paid dues in 2012
New Graduate Memberships	200.00	100.00	4 New Graduates paid dues in 2012
Meeting Income	9,270.00	10,000.00	2011 IABC proceeds; WVC - South Africa
Income - WAVMA merch	0.00	500.00	
Donations / Sponsorship	1,000.00	1,000.00	Donation
<b>Total income:</b>	20,520.00	20,500.00	



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## 2012 WAVMA EXPENSES

EXPENSE DETAILS	ACTUAL	BUDGETED	NOTES
<b>MEETINGS</b>			
<i>Annual General Meeting</i>	251.22	2,000.00	At AVMA Convention - San Diego
<i>Aquaculture America</i>	0.00	500.00	Booth Fee
<i>WSAVA</i>	0.00	500.00	Meeting Travel Expenses
<i>AVMA/AqVMC</i>	0.00	1,000.00	2 meetings @ \$500 each
<i>NOVICE - Buccharest</i>	759.00	2,000.00	Travel - CW, DS, LU
<i>EFHW</i>	500.00	500.00	Sponsorship
<b>Total Meetings expenses:</b>	1,510.22	6,500.00	
<b>ADMINISTRATIVE</b>			
<i>Illinois Secretary of State</i>	13.00	13.00	Corporation Annual Report Fee
<i>Credit Card TXN Fee</i>	642.86	420.00	Average of \$35/month - USA Epay
<i>Bank Fees</i>	137.50	180.00	Average of \$15/month
<i>Insurance</i>	0.00	0.00	
<i>US Treasury - NFP Filing</i>	850.00	850.00	Non-Profit filing fee
<i>Office supplies</i>	316.00	100.00	For NOVICE meeting
<i>WAVMA Store Merch</i>	293.23	600.00	WAVMA Polo Shirts for sale
<i>Postage/Shipping</i>	0.00	500.00	
<i>Promotions for Booths</i>	500.00	500.00	Brochures/Banners/Give-aways
<i>Contributions</i>	0.00	500.00	AVMA AqVMC P&O/EFHW
<i>Dues</i>	839.62	1,000.00	WSAVA \$166 / WVA \$673.62 2012 Dues
<i>AVMA Scholarship</i>	0.00	1,000.00	
<b>Total admin. expenses:</b>	3,592.21	5,663.00	
<b>SERVICE &amp; EQUIPMENT</b>			
<i>Accounting - DD Pyle</i>	1,248.03	2,700.00	2010 & 2011 Tax Filing fees
<i>Legal - DKM&amp;O</i>	3,163.75	500.00	2011 Annual Report fee / IRS 1024 Filing
<i>Matrix/AMC Management</i>	1,191.00	5,000.00	Soliciting membership and funding
<i>Skype/Telephone</i>	0.00	100.00	
<i>Survey Monkey</i>	200.00	200.00	
<i>2011 Outstanding web expenses</i>	8,212.71	2,000.00	Reimbursed Chris Walster for 2011
<i>2012 Website Hosting Account</i>	1,073.91	3,000.00	Prepayment for web hosting in England
<b>Total S&amp;E expenses:</b>	15,089.40	13,500.00	

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COMMITTEE REPORTS

First Quarter 2013

## First WAVMA Student Chapter Formed at Tuskegee University, School of Veterinary Medicine

Jessica Dewar (TU-SVM, Class of 2014)

Since meeting Dr. David Scarfe at the 2012 SAVMA symposium, students Wesley Dyer and Jessica Dewar have been teaming up with Raphael Malbrue, the current SCAVMA president at Tuskegee University, School of Veterinary Medicine and Dr. Scarfe to begin building the first nationally recognized student chapter of WAVMA at TUSVM.

Working as a team we have been diligently working on what TU students want in their new Chapter, developing by-laws and planning events the new chapter hopes to host for 2013. Overall the chapter hopes to expose students to basic handling and husbandry of aquatic species, research being conducted in aquatic species and job careers available as an aquatic animal veterinarian.

The initial Officers of the Chapter include Jessica Dewar (President), Wesley Dyer (Vice President), Raphael Malbrue, Lore McBroom and Lauren Dodd with Dr. Kenneth Newkirk serving as the Faculty Advisor.



**Photo:** Left to right - Raphael Malbrue (TU '14), Wesley Dyer (TU'14), Jessica Dewar (TU'14) deliberate over details in the by-laws of the new student chapter (photo courtesy of Jessica Dewar)

Some of the specific activities planned for 2013 include:

Assisting at the WAVMA aquatic veterinary booth at the 2013 SAVMA Symposium in Baton Rouge, Louisiana.

Regular monthly Chapter meetings to discuss aquatic veterinary student activities.

A Georgia Aquarium visit to talk with aquarists and veterinarians about aquarium animal husbandry and veterinary care.

A trip to Emory University visit to speak with

aquatic researchers or the veterinary staff at the Department of Animal Resources about aquatic veterinary research.

Invited guest speakers to provide lectures (and possible wet labs) on fish or other aquatic animal anatomy, clinical examination, necropsy and anesthesia.

A trip to a local fish hatchery to find out what they do and how to run a hatchery.

Developing a WAVMA sub-group on NOVICE for communicating with other WAVMA Student Chapters.

Keep members updated on WAVMA Scholarships and available externship, internships and jobs.

As part of promoting WAVMA Student Chapters to other vet students, several Tuskegee Chapter members assisted at a WAVMA/AVMA aquatic veterinary booth at the 2013 Student American Veterinary Medical Association Annual Symposium in Baton Rouge, Louisiana. Held every spring and hosted by a different vet school in the U.S. or Canada, the SAVMA Symposium attracts as many as 1,500 vet students from all across North America and many vet schools in other countries.

The response from students was terrific and groups from several vet schools including Michigan State University, University of Wisconsin, Purdue University, Louisiana State University, University of California, University of Illinois and several others, pledged to get interest from their classmates on starting new chapters.



**Photo:** Jessica Dewar (TU Student Chapter president) helping another student get information on how to network and find more information about aquatic veterinary medicine.

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AUTHOR'S INSTRUCTIONS

First Quarter 2013

## Instructions for Authors and Contributors

While any information relevant to aquatic veterinary medicine might be published, we particularly invite contributions for the following regular columns in *THE AQUATIC VETERINARIAN*:

### Colleague's Connection

An article explaining why and how a veterinarian became interested in aquatic veterinary medicine and what that veterinarian has done in their aquatic veterinary career.

### Peer-Reviewed Articles

Original research or review of any aquatic veterinary topic. Articles will be reviewed by 3 veterinarians and comments and changes referred back to the author prior to publication. The text for an article begins with an introductory section and then is organized under the following headings:

- Materials and Methods
- Results
- Discussion (conclusions and clinical relevance)
- References (cited in the text by superscript numbers in order of citation).

### Clinical Cases

Clear description of a distinct clinical case or situation and how it was resolved. These may be submitted for peer-review. Begin with the signalment (species, age, sex, body weight or length) of the animal or animals, followed by a chronologic description of pertinent aspects of the diagnostic examination, treatment, and outcome, and end with a brief discussion.

### Book Reviews

Brief review of a published book, including an overview and critique of the contents and where to obtain the book.

### Publication Abstracts

Abstracts of published veterinary and scientific journals with full citation/reference (authors, date, title, and journal volume and page numbers – ½-1 page).

### News

Brief synopsis or information about aquatic veterinary news published elsewhere. List original source of information.

## Legislative & Regulatory Issues

Synopsis or description of emerging legislation or regulations with information on how to access further detailed information or a link to website.

## Meetings and Continuing Education and Professional Development (CE&PD) Opportunities

Description or synopsis of upcoming aquatic veterinary or (veterinarian-relevant) non-veterinary in-person or on-line educational meetings noting the meeting title, dates, location, and contact person or website.

## Jobs, Externships, Internships or Residencies

Description with specific contact information for veterinary student externships and post-graduate internships or residencies at private practices, institutions, universities or organizations. Description of available full or part-time employment for aquatic veterinarians, with contact information.

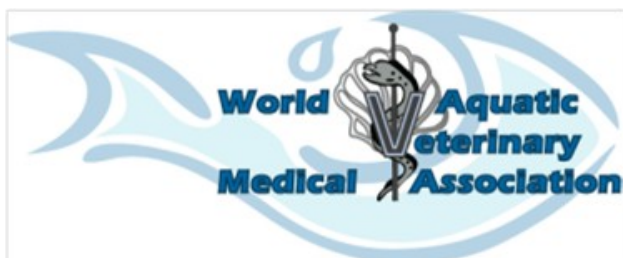
## Please send articles, clinical reports, or news items to the editor by the following submission dates:

- Issue 1 – February 15 (published in March)
- Issue 2 – May 15 (published in June)
- Issue 3 – August 15 (published in September)
- Issue 4 – November 15 (published in December)

All submissions should be in 10-point Arial font, single spaced. Submissions may be edited to fit the space available.

We can also use editors to proof-read submissions or review articles. Please contact the Editor if you are interested in assisting.

The World Aquatic Veterinary Medical Association also has opportunities for members to assist with committees. Contact any member of the Executive Board to volunteer to help.





# THE AQUATIC VETERINARIAN

Volume 7, Number 1

COLLEAGUE'S CONNECTION

First Quarter 2013

## Meet Your Editor— A Life-Long Lover of Fish: Nicholas Saint-Erne, DVM

When I was very young I found insects fascinating and wanted to become an entomologist when I grew up. However, a change of plans occurred at the age of nine when a neighborhood friend gave me a Mason jar containing guppy babies that were born in his aquarium. I took that home and set up an old 5-gallon, metal-framed, slate-bottomed aquarium that my parents had stored down in the basement. It had the clear plastic corner box filter with carbon granules and fiber floss for filtration, run by a small and noisy air pump. I set it up on a counter by the kitchen table where we could watch the fish while eating. That was in June, 1968 when I was nine years. On my 10th birthday that December, my parents bought me a 10 gallon all-glass aquarium to upgrade my fish keeping. I also got a variety of other fish, including green swordtails, kuhlii loaches and black skirt tetras.

By that time I had really become interested in keeping aquarium fish and knew the scientific names of every fish that I had in my tank. I also subscribed to Tropical Fish Hobbyist magazine. The December 1969 issue of Tropical Fish Hobbyist contained an article about Nishikigoi, the Japanese Imperial colored carp. This was my introduction to koi. I found them fascinatingly beautiful and wanted to get some from that time on. It wasn't until many years later when I finally graduated from college and bought my own house that I was able to put in my own koi pond. But from that time in 1969 when I got my TFH magazine I have been interested in working with koi, as well as and other fish. I also loved other animals, having kept box turtles as pets since I was six years old and having had a dog and a cat, so it was only natural to want to become a veterinarian, but what was unusual is that from an early age I want to become a fish vet!

In high school I had enrolled in all the science classes I could take and then when I got into college at Kansas State University I studied Fisheries Biology as my major, including all the preveterinary classes. While I was in college, TFH Publications came out with a new book in 1979, *Fish Diseases* by veterinarian Dr. Marcus Dulin. I eagerly read it thoroughly, as here was a veterinarian who knows about fish diseases! I wrote a letter (there was no such thing as email then) to Dr. Dulin and I asked him if he thought it was possible to make a living as a fish veterinarian. Dr. Dulin actually wrote me back

and said that he thought it would be a very "lucrative career" (his words) - I had to look up lucrative in the dictionary - and my career course was set. I was accepted into the Kansas State University College Veterinary Medicine and graduated as a DVM in 1984.

At that time there were no classes on fish, reptiles or other exotic animals and only one elective on bird medicine taught by Dr. Terry Campbell, who was at KSU at the time is now at Colorado State University. In the summer after my first year at vet school I did an externship at the Sedgwick County Zoo, in my hometown of Wichita, Kansas. I was fortunate enough to be able to attend the AquaVet program at the Marine Biological Laboratory in Woods Hole Massachusetts in 1982 during my second summer break. That was an excellent opportunity and introduced me to many other veterinarians who are also interested in fish medicine. For my third summer break I did an externship in Phoenix, Arizona in a surgical practice with a Board-Certified surgeon, Dr. Jack Henry.

After I graduated from college I moved to Las Vegas, Nevada because it was a very fast growing city and had lots of new veterinary clinics opening. The job opportunities there were at much higher wages than what they were paying in Kansas. Little did I know at the time that working in Las Vegas involved 70 hour work weeks plus covering all of your own emergency calls at night. But I learned a lot and I was able to expand my practice into exotic pets, including fish, reptiles, birds and even zoo and performing animals. I took care of the animals for many of the magicians performing in Las Vegas, such as their doves and falcons, lions and tigers and other animals that they used in their magic shows. I also took care of the fish in the koi ponds at the Tropicana Hotel, and many private fish ponds, as well as pet store animals.

*Nick inspecting koi at a farm in Japan. Yes, they are Big!*



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Enjoying a visit with Takashi Amano at his Aquarium Design Amano studio, in Niigata, Japan

See his website: <http://www.adana.co.jp/en/gallery/>

Being in private clinical practice, I was able to incorporate fish medicine in my clinic and would see fish on a regular basis every week, including making house calls and examining koi in home ponds for clients. When I first started, there were very few resources for aquatic veterinary medicine and most of the information I learned was from aquarium hobbyist books or fisheries science publications. It was with great rejoicing that in 1993 I was able to get the newly published book *Fish Medicine*, edited by Dr. Michael Stoskopf, which was one of the first true aquatic veterinary books readily available for veterinarians who wanted to learn about fish medicine. This book, along with my copy of Dr. Ronald Roberts *Fish Pathology*, 2<sup>nd</sup> edition (1989) were the tomes that guided my wet pet practice.

When I was in private practice working on Koi, I would need to look up information in many different places, so I eventually started writing down information I used frequently and compiled it into a single source so that when I needed information I didn't have to go find it in different books. I would also give lectures to the local tropical fish society and the local pond and koi society and would make lecture notes for my talks. Over a period of time I had lecture notes for a variety of different topics about fish diseases. Eventually I compiled all these notes into the book *Diseases of Koi* (1994). At Dr. Greg Lewbart's urging, I added to that book more information on water quality, pond filtration and noninfectious diseases of koi and published my second book, *Advanced Koi Care*. This is now in its second edition and in the 10 years since its original publication I have found that it completely answers every question I have had in the care of koi and even most tropical fish in my clinical practice over

that time.

While in private practice I took care of the sick pets in the PetSmart chain of pet stores as their local veterinarian. After working with their stores in Las Vegas for about five years, I suggested that I work directly for the corporate office as their Quality Assurance veterinarian to develop health care programs for all of their stores. I interviewed first with the CEO (Sam Parker) and then with the Vice President for the Specialty Pet Department, and was offered a job. In 1999 my family and I moved from sunny Las Vegas to sunnier Phoenix, Arizona to become the veterinarian for all the PetSmart stores.

Since that time we have expanded to five veterinarians in the corporate office, all working to improve the health of the pets sold at the stores and develop best practices for the care of pets and innovative pet products. We have nearly 1300 pet stores and produce over \$6 Billion annually in revenue. My position now is overseeing the health of the fish, reptiles and amphibians sold in PetSmart stores and entails annually visiting the breeders and distributors from whom we purchase our pets and helping them improve the quality of the pets they produce and sell. I also supervise the fish health care in our five (soon to be six) fish distribution centers around the US where all of the fish from various sources, both overseas and domestic, are examined and treated by the Fish Health Managers before being sent to our stores. I also work with the store associates and customers in educating them on the best ways for taking care of pets. This has been a very enjoyable and rewarding career, and I'm glad I get to work with fish and make a very good living doing that. Dr. Dulin was absolutely right – aquatic veterinary medicine can be very lucrative career decision.



Boarding one of PetSmart's corporate jets for a vendor visit. Traveling in Style!

## Overview Of The Larval Eustrongylidosis In Freshwater Fish Captured From The Danubian Delta, Romania

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### Introduction

Recently interest has been shown on understanding whether there is a possible existing connection between heavy metals and the biology of some aquatic parasite groups such as acanthocephalans, cestodes, nematodes and trematodes. This study, which was conducted in the Razelm-Sinoe Lagoon Complex (Figure 1) between March 2003 and March 2008, was based on four major statements available in the scientific literature: i) environmental pollutants – including heavy metals – seem to increase parasitism frequency within fish populations by increasing the host susceptibility or the abundance of the intermediate hosts and/or vectors of the parasite<sup>1, 2</sup>; ii) certain heavy metals, such as cadmium (Cd), copper (Cu), lead (Pb) and zinc (Zn) have been found to be 6 to 280 times higher in concentration in cestodes and acanthocephalans than in their hosts<sup>2, 3, 4</sup>; iii) the larval stages of the parasites are not able to take up any amounts of heavy metals within their hosts<sup>1</sup>; iv) nematodes are not as reliable as the cestodes and the acanthocephalans at indicating aquatic heavy metal pollution, if the pollutants are at small concentrations in the water<sup>5, 6</sup>.

To provide additional scientific information on this subject matter, the interrelationship between the heavy metals present in a natural aquatic environment, eight fish species inhabiting the environment (i.e. *Silurus glanis*, *Hypophthalmichthys molitrix*, *Rutilus rutilus*, *Scardinius erythrophthalmus*, *Abramis brama*, *Aspius aspius*, *Perca fluviatilis* and *Stizosteidon lucioperca*) and the larvae of an endemic nematode, *Eustrongylides* spp. (Phylum: Nematoda), were taken in a series of ecological studies. The main goal of this study was to assess whether the third and the fourth larval stages of the nematodes were able to absorb any amounts of heavy metals within their fish hosts.

## The Danubian Delta Biosphere Reservation REZERVATIA BIOSFEREI DELTA DUNARII

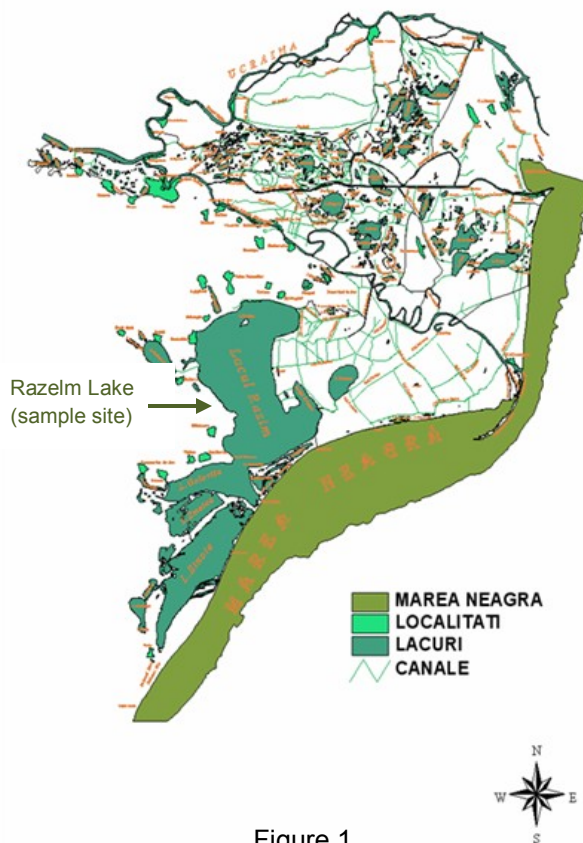


Figure 1.  
Sample site: the Razelm-Sinoe Lagoon Complex

### Biology of the *Eustrongylides* spp. larvae

*Eustrongylidosis* occurs in marine and freshwater finfish. It is caused in the fish by the third stage larva of an adenophorean nematode from the genus *Eustrongylides*, which inhabits as an adult a piscivorous wading bird. The parasite has a worldwide distribution and, of the three most studied species, *E. ignotus*, *E. tubifex* and *E. excises*, the latter two have been reported in Europe<sup>7</sup>.

The known life cycle of the *Eustrongylides* implies that the adult parasite lives into the proventriculus of aquatic birds. The eggs of *Eustrongylides* pass through the bird's feces into the water, where a first stage larva develop within the egg. When the larvated eggs are ingested by aquatic oligochaetes, which are the first intermediate host of the parasite, the larva emerges from the egg, molting twice to reach the third stage, which is



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the infective stage for the finfish. Small fish feeding on the oligochaetes are considered a second intermediate host of *Eustrongylides* as, when infected by the third stage larva, one more molt would further take place within their body, thus reaching the fourth larval stage. Under this form, the parasite becomes infective for the piscivorous birds.

Within the fish body, the third stage larva usually migrates actively throughout the tissues of the host, and before the last molting stage takes place, it encysts at the surface of the organs or the tissues in the peritoneal cavity. Usually, the third stage larva (L<sub>3</sub>) is a migratory, active stage, whereas the fourth stage larva (L<sub>4</sub>) is a non-active, immobile one.

However, apart from the intermediate and definitive hosts previously mentioned, *Eustrongylides* larvae have also been reported recently in piscivorous fish, amphibians and in the dice snakes inhabiting the Histria and Jurilovca regions (Fig. 2, 3), which usually feed on syrman goby (*Neogobius syrman*)<sup>7</sup>.

During an investigation on parasitic fauna in wild reptiles that was performed in 2005 within the Razelm-Sinoie Lagoon Complex, it was found that around 30% of the syrman goby were infested with *E. excisus*<sup>8</sup>. The water snakes do not normally take part in the parasite's life cycle since no further development takes place in these hosts; they are considered transport (or paratenic) hosts.

Other published works<sup>9, 10</sup> indicate that humans may also serve as incidental hosts of the L<sub>3</sub> and L<sub>4</sub> larvae. However, human infestations with *Eustrongylides* have not been reported in Romania, and the situation will probably remain unchanged, as such cases are related to eating uncooked or undercooked fish, which is not a common eating habit of the people in the region.

Interestingly, in the European perch (*Perca fluviatilis*), the *Eustrongylides* larvae were often found accompanying the protozoa *Myxobolus* (Fig. 4), the cestode *Triaenophorus* (Fig. 5), and two parasites simultaneously: the cestode *Triaenophorus* and the annelid *Piscicola*<sup>11, 12</sup> (Fig. 6). Multiparasitism is not uncommon in fish, but the constant presence of the *Eustrongylides* larvae within the fish was what stood out. It appears that, apart from having an obvious tendency of expanding its host specificity, this helminth is a versatile parasite that may easily coexist with other parasite species.



Figure 2.  
Dice snake  
eating a  
syrman  
goby.  
Photo:  
David Mod

Figure 3.  
Encysted  
*E. excisus*  
larva in *Natrix*  
*tessellata*  
(Dice snake/  
Water snake)



Figure 4.  
*Myxobolus*  
cysts (arrow)  
and  
*E. sp.* larvae  
(red worms)

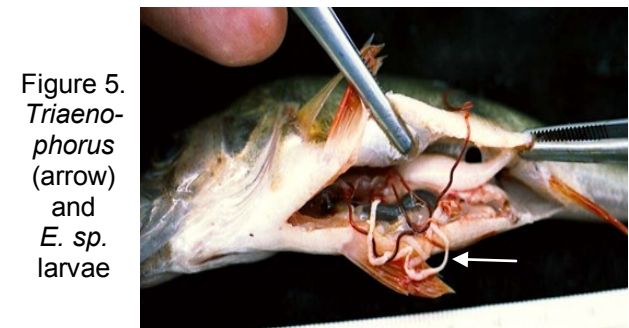


Figure 5.  
*Triaenophorus*  
(arrow)  
and  
*E. sp.*  
larvae

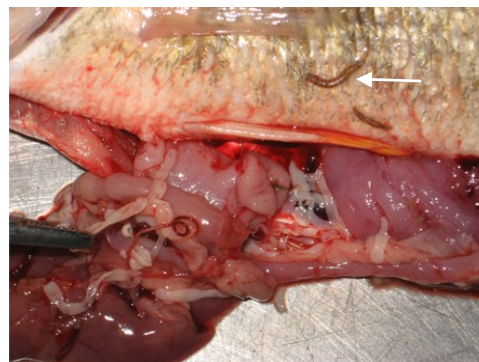


Figure 6.  
*Triaenophorus*,  
*Piscicola*  
(arrow)  
and *E. sp.*  
larvae

## Pathogenicity of the *Eustrongylides* spp. larvae

It is widely recognized and accepted that most parasites are harmful to their hosts, even though, as in most parasitic diseases, their presence is usually clinically undetectable. Although the larval nematode was found unevenly distributed among the studied fish species<sup>13</sup> (Table 1), most of the infected fish showed tissue lesions caused by the larvae<sup>12</sup>. The mobile larvae, presumably L<sub>3</sub>, appeared to cause more damage to fish than the encysted forms (presumably L<sub>4</sub>). While mostly discrete and localized tissue lesions associated with parasitic granuloma formation were found within the infected fishes that had more encysted than free larvae (Figs. 7 - 9), this was not the case when the actively migrating larvae were found as a majority within their host (Figs. 10, 12). To some extent, this particular aspect can be related to the fact that the mobile larvae, through their free migration within the host body, are able to cause damages to different tissues in a relatively short time, whereas the encysted larva is immobile, less active or, if dead, even non-active metabolically, and therefore, affecting slightly only a limited area of the tissue within which they encyst.

However, in the older and high infestations, irrespective of the proportion between the mobile and immobile larvae, severe visceral, mesenteric adhesions and ascites were found (Figs. 9 - 11).

(Table 1)

<i>Silurus glanis</i> Somn	<i>Aspius aspius</i> Avat	<i>Perca fluviatilis</i> Biban	<i>Sander lucioperca</i> Șalău
0	72.73	84.81	85.23

Table 1.  
Mean values (%) of fish infested with the *Eustrongylides* spp. in the Razim–Sinoie area (for the year 2007)

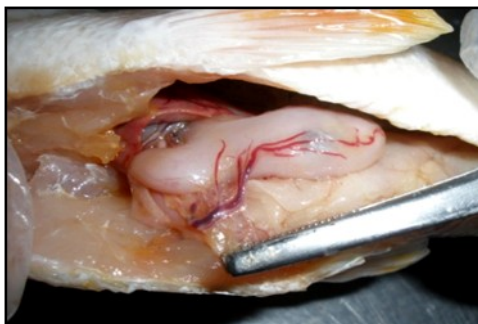


Figure 7.  
Congestion in *Perca fluviatilis* (European perch)

Figure 8.  
Encysted *E. spp* larvae in the peritoneal serosa of *Stizosteidon lucioperca* (pike perch)

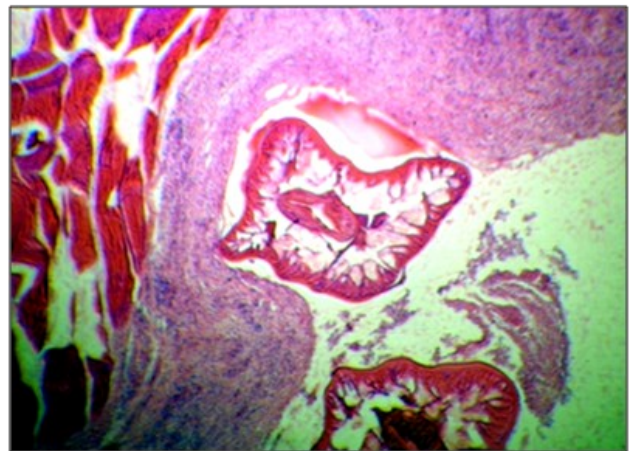
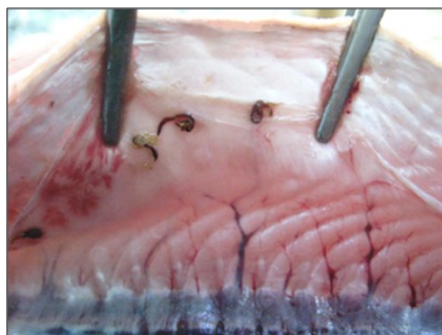


Figure 9.  
Photomicrograph showing connective tissue hyperplasia & leukocyte infiltration into the striated muscle of *Perca fluviatilis* (European perch) around two transversal sections of *E. spp* larvae.



Figure 10.  
Ascites, adhesions and migratory larvae in *Perca fluviatilis* (European perch)





Figure 11.  
Mesenteric & visceral adhesions and encysted larvae in *Aspius aspius* (rapacious carp)



Figure 12.  
*E. spp.* larvae in *Perca fluviatilis* (European perch)

### Discussion:

#### ***Eustrongylides spp.* larvae, biofilters and environmental pollution bioindicators?**

Unlike the usual concept of parasitism, our studies showed that in certain environmental conditions the *Eustrongylides spp.* larvae may actually be beneficial to the host<sup>13</sup>.

When we conducted the study series aiming at assessing the incidence of the *Eustrongylides* parasitism on the fish populations inhabiting in the Razelm-Sinoe Lagoon Complex (Jurilovca province, Tulcea district, Romania), we discovered that from the species gathered (i.e. *Silurus glanis*, *Hypophthalmichthys molitrix*, *Rutilus rutilus*, *Scardinius erythrophthalmus*, *Abramis brama*, *Aspius aspius*, *Perca fluviatilis* and *Stizosteidon lucioperca*), only three species were infected by the *E. spp* larvae (i.e. *Aspius aspius*, *Perca fluviatilis* and *Stizosteidon lucioperca*), and the parasite had an uneven distribution within the populations<sup>13</sup>.

When the lesions and the presence/absence of the parasitism were correlated with the water, water plants, water sediments, the fish tissues (i.e. muscle and liver) and the heavy metal content within the larvae, we arrived to an intriguing hypothesis, that, not only were the nematode larvae able to successfully absorb certain amounts

of lead, cadmium and mercury, even when the metals were undetectable in the water (Table 2), but according to the degree of the lesions found in the liver and muscle tissue – biochemically assessed by the activity of the superoxide dismutase (SOD) and glutathione peroxidase (GPx) – it seemed that the pathogenic effect induced in the muscle by the larvae might have been greater than the heavy metal exposure effect on the uninfected fish (i.e. muscle samples)<sup>13, 14</sup> (Table 3).

The activity of superoxide dismutase (SOD) and glutathione peroxidase (GPx) against mercury in Perch and Rudd

(table 3)

Fish species	Tissue samples			
	Muscle		Liver	
	SOD (U/mg)	GPx (mU/mg)	SOD (U/mg)	GPx (mU/mg)
Perch BIBAN (infected)	2,30	6,50	3,05	8,40
Rudd ROȘIOARA (non-infected)	3,15	10,20	2,90	8,72

The muscle and liver lesions which were found in the fish samples correlated with a decreased activity of the SOD. In general, SOD and GPx activity decrease when an increase in superoxides ( $O_2^-$ ,  $OH^{\cdot}$ ,  $H_2O_2$ ) takes place, during the cellular oxidative stress process. Perch (*Perca fluviatilis*) which were naturally exposed to heavy metals and found infected with the *Eustrongylides* larvae, showed decreased SOD values in the muscle tissue.

Rudd (*Scardinius erythrophthalmus*) exposed to the same environment, but not infested with the *E. spp* larvae, showed decreased SOD levels into the liver; yet, considering the obtained values of the SOD for the perch liver, the activity of SOD did not seem as low as expected. Thus, we inferred it was possible that the *Eustrongylides* larvae are able to protect the host liver against the pathogenic effect caused by the heavy metal exposure, by filtering the substances absorbed into the host tissues from the water.



**TABLE 2. HEAVY METAL VALUES IN FISH, LARVAE, WATER, PLANT AND SEDIMENT<sup>15</sup>**

**Pb detection limit in muscle (A.A.S.G.O.): 1.0 µg/kg; Hg detection limit in muscle (A.A.S.S.O.): 0.1 µg/kg; Cd detection limit in muscle (A.A.S.S.O.): 0.1 µg/kg; Cu detection limit in muscle (A.A.S.G.O.): 100 µg/kg; Zn detection limit in muscle (A.A.S.G.O.): 20 µg/kg**

Sample type	Fish species	Pb (µg/kg)	Hg (µg/kg)	Cd (µg/kg)	Cu (µg/kg)	Zn (µg/kg)
<b>Fish</b>	<i>H. molitrix</i>	22,75	Abs.	6,72	330,00	3810,00
	<i>S. lucioperca</i>	35,83	31,56	10,82	160,00	4700,00
	<i>R. rutilus</i>	14,21	48,92	7,28	270,00	4740,00
	<i>S. erythroptalmus</i>	96,03	23,93	4,25	660,00	7800,00
	<i>A. brama</i>	15,67	Abs.	1,20	450,00	5330,00
	<i>P. fluviatilis</i>	24,00	35,81	0,98	380,00	4070,00
	<i>A. aspius</i>	24,88 (M*)	101,03 (M*)	1,39 (M*)	540,00	4080,00
	<i>A. aspius</i>	340,00 (L*)	46,00 (L*)	36,00 (L*)	-	-
	<b><i>Eustrongylides</i> larvae</b>		420,00	0,9	0,5	-
<b>Water</b>		0,600	Abs.	Abs.	3	39.780
<b>Common reed leaves (<i>Phragmites communis</i>)</b>		132	-	7	730	21.740
<b>Sediments</b>		1,492	15,03	Abs.	5360	3

\*M - muscle; L - liver

Another interesting aspect concerning the *Eustrongylides* larvae behavior is that they were seen invariably emerging from the fish carcasses, by passing through the natural foraminae (and possibly by penetrating the tissues), shortly after the fish host dies (Fig. 13). This antagonizes the theory concerning the host-parasite relationship, according to which a definitive parasite cannot live if its host dies.



Figure 12. *Eustrongylides* larvae emerging from its fish host following the fish death

### Conclusion

To conclude, from the series of the study, which were performed from March 2003 to March 2008, with the main aim to provide additional scientific information on the interrelationship between envi-

ronmental (i.e. a natural aquatic biosystem) pollution, a widespread endemic larval nematode infection in fish, and the fish inhabiting the environment, and based on the introductory four i) to iv) statements, we found that:

The third and the fourth larval stages of the nematode *Eustrongylides spp* were able to take in significant quantities of lead (Pb) from their fish host (i.e. up to 11 times higher than in fish);

Counter to the statements iii) and iv), the nematode larvae were able to absorb, in certain circumstances, more or less, lead, cadmium and mercury, even when the metals were at undetectable levels in the water;

The uninfected studied fish species, rudd (*Scardinius erythroptalmus*) – except for the mercury intake - showed the highest absorption ability for the heavy metals;

The studied fish and larvae samples showed various amounts of heavy metals, at a low to zero level (Table 2) of the heavy metal detection in the water samples;

Since maximum levels of different heavy metals were detected in both fish groups - whether they were infected or not - that shared the same environmental conditions and were captured at the same moment in time, it was concluded that the theory referring to the heavy

metal influence on host susceptibility [i]) did not apply to the case. Other influencing factors related to the species specificity, the individual immunity characteristics, as well as other possible favorable or predisposing circumstances may have a greater influence over the host susceptibility to parasitism than the heavy metal environmental water pollution.

However, further studies are necessary to investigate:

What species of *Eustrongylides* are involved with the process of the heavy metal absorption within the host;

What is the biochemical path that may enable a selective absorption of the heavy metals<sup>15</sup> within the mobile *Eustrongylides spp* larvae;

Why in two out of the five fish species belonging to the uninfected group, *H. molitrix* and *A. brama*, it was not found any trace of mercury in the muscle tissue, although these species shared the same environmental conditions with the rest of the sampled fish;

Why the highly infected fish showed greater amounts of heavy metals in their muscle tissue than in the liver, an organ that in fish is an integrator of the physiological and biochemical functions;

Is there a potentially protective effect of the helminthes within their hosts (i.e. mainly of the liver) against certain heavy metals and other types of aquatic pollutants?

Nonetheless, perhaps it is also worth investigating what are the driving forces that make the *Eustrongylides* larva emerge from the fish host once it is no longer living, and whether the larva is then able to find another intermediate or paratenic host in which to continue its life cycle.

## Acknowledgments

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## Idiopathic Deaths in *Danio kyathit*

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### Abstract

We describe the case of acute mortality in *Danio kyathit* – a species related to the zebrafish *Danio rerio*. As the disease symptoms remained non-specific, we designed and implemented an improved diagnostic approach, based on advanced mass spectrometry measurements. Our improved approach takes advantage of comparative mapping of peptides to protein sequences inferred from *D. rerio* chromosome assembly. The approach seems informative regarding the possible pathomechanism of the described case: in particular, based on the protein profile of identified serum-borne factors, we propose the involvement of immune / inflammatory component. We speculate on possible etiology of the condition resulting in high mortality.

### Key words

Idiopathic anemia, blood plasma proteins, LC-ESI-MS (liquid chromatography – electro spray – mass spectrometry), comparative mapping, zebrafish genome sequence, danionin sister species, *Danio rerio*, *Danio kyathit*.

### Introduction

Danionin fish species are widely recognized as ornamental fish, and are also regarded as genetic model organisms. In particular the zebrafish *Danio rerio* has been used as a laboratory organism (q.v., <http://zfin.org/>). Importantly, *D. rerio* husbandry has resulted in a marked increase of interest in the laboratory colony management, including aspects of aquatic animal health. *D. rerio* colonies main-

tained for research purposes are subject to specialized disease prevention / diagnosis-oriented veterinary care (e.g., <http://zebrafish.org/zirc/health>). Veterinary services providing care for the laboratory fish colonies have described major diseases affecting *D. rerio* isolates<sup>(1)</sup> and developed diagnostic and preventive procedures and recommendations.

However the above aquatic health services seem to focus on species specific issues relevant to *D. rerio* colony maintenance. In contrast, the health problems associated with other danionins, representing the species other than *D. rerio*, remain mostly anecdotal. The comparative nature of genetic analysis in model organisms, however has recently brought so called 'sister species' to the focus of the research attention<sup>(2,3)</sup>. In particular, *D. kyathit* has been proposed to be used in research as a sister species of *D. rerio*. Provided with comparative aspects of genetic analysis in the laboratory model species, issues and conditions in *D. kyathit* health and husbandry appear relevant.

Therefore, given this relevance, here we report the case of idiopathic deaths in *D. kyathit*. We believe that our advanced methodology will greatly complement the current diagnostic procedures.

### Case Description

The affected fish showed grossly non-specific symptoms. The initial signs observed were lack of food response, followed by emaciation progressing into cachexia, with apparent incoordination in the terminal stages, inevitably resulting in death within 2-4 days of onset of signs.

Upon necropsy, most of the internal organs (including gonads, consistent with the lack of detectable peripheral blood vitellogenins in female preparations) appeared markedly atrophied. Contours of liver, kidney and other vital organs disappeared, instead forming an opaque gelatinous mass filling the inside of the body cavity.

Blood collected onto trypsin coated strips (see Methods) lacked characteristic red/white phasing (consistent with separation of cellular elements from plasma). Instead, the collected blood appeared discolored (opaque–greyish), recollective of exudate or other type of hemoglobin-less effusion.

Unfortunately, due to the reduced overall volume of circulating blood in the affected fish, this precluded the morphological examination of cellular elements present.



## Methods

Fish were kept at standard laboratory conditions. Blood samples were collected from anesthetized individuals of *D. kyathit* prior to standard necropsy. Due to the small sample volume, vena cava blood was collected with 2.5x25.0 mm strip of chromatography paper (3M), coated with buffered trypsin. Spectra were measured with LC-ESI-MS (Orbitrap, ThermoScientific). Peptide sequences were inferred from computer-aided search of the zebrafish conceptually predicted proteins (NCBI)<sup>(4)</sup>. Identified blood plasma proteins were mapped onto the *D. rerio* 25 linkage groups essentially as those appear in Zv8 Ensembl chromosomal assembly<sup>(5)</sup>. Comparative mapping data are available on request from corresponding author.

## Signalment & History:

On average we observed the loss of one individual per 24 fish per week, with ~15% survivors (who lived into normal life span). Predominantly affected were individuals of a smaller size.

## Clinical Test Results:

Upon necropsy, we excluded the presence of metazoan parasites and excluded capillariosis based on absence of nematode eggs in fecal smears. Wounds, scars, or ulcers were absent and the scales appeared normal. Affected fish were apparently non-kyphotic. Detailed dedicated microbiological and histopathological investigations were not performed.

## Specialized Clinical Test Results:

Blood plasma collected from affected individuals were significantly enriched for proteins representing two groups of factors: complement system components (including factors C3, C3b, C3c, C4-2, C5-1, C6, C7, C9, CFB, CFD, CFH and properdin) and several members of alpha-2-macroglobulin family (and few other factors, e.g. alpha-2-HS-glycoprotein of uncertain significance), while relatively depleted for hemoglobin chains, (sero-) transferrin and (sero-)parvoalbumins. Together this is strongly indicative for immune/inflammatory changes.

Lipoproteins (mainly apolipoproteins), ceruloplasmin, angiotensinogen, plasminogen,



*Danio kyathit*

Picture by

[Baesler, Siegfried.](#)

[Fishbase.org](#)

hemopexin, pentaxin, retinol binding protein, sex hormone binding globulin, immunoglobulin chains and fibrinogen chains levels were estimated as relatively unaffected.

## Treatment Options:

None available.

## Discussion & Conclusions:

In the broader perspective, we suggest the developed diagnostic strategy will greatly complement current diagnostic procedures in *D. rerio* and other danionins. We speculate, based on symptoms similarity, this condition is somehow reminiscent of the infection with microsporidia of genus *Pseudoloma* described<sup>(1)</sup> in *D. rerio* laboratory populations (with exception of the vertebrate kyphosis not observed in *D. kyathit*). We note however, provided established existence in *D. rerio* populations asymptomatic carriers of *Pseudoloma*, it might be difficult to conclusively exclude if described idiopathic anemia isn't a condition co-occurring with speculated *Pseudoloma* infection. As per whether *Pseudoloma* (or any other infectious agent) known to infect *D. rerio*, could possibly be transmitted to sister species *D. kyathit* remains to be demonstrated. Blood smear examinations and histopathology testing may have demonstrated *Pseudoloma* or other disease organisms not in evidence with our examinations.

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- (5). ([http://www.ensembl.org/Danio\\_rerio](http://www.ensembl.org/Danio_rerio))

# THE AQUATIC VETERINARIAN

Volume 7, Number 1

GRAND ROUNDS CASES

First Quarter 2013



Dear WAVMA,

These organisms were seen in a display marine aquarium. They are attached to rocks and various substrates. They die in response to formalin treatments, but just go limp and stay attached.

Does anyone know what they are, their significance and whether we should be trying to control it?

**Dr Richmond Loh**

[The Fish Vet](#)

While it's difficult to determine size from the picture, this may be a young gorgonian coral. Many juvenile or newly forming colonies; and some species lack a lot of structures most people associate with corals. Microscopy may help, but does this cause a problem to the tank/s?

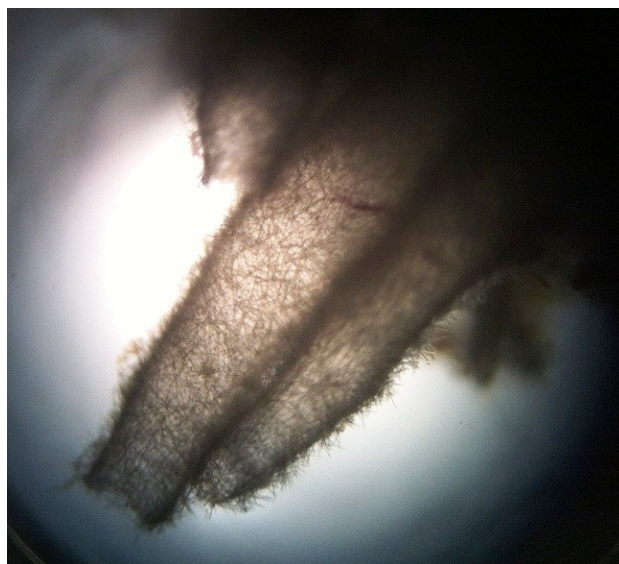
**A. David Scarfe PhD, DVM, MRSSAf**

[dscarfe@avma.org](mailto:dscarfe@avma.org)

I agree that this appears to be a sponge (Phylum Porifera). In the last photo there are a few Isopods (Phylum Crustacea) crawling over the sponge.

**Nick Saint-Erne**

[Saint-Erne@Q.com](mailto:Saint-Erne@Q.com)



From the microscope images, I suspect this is a juvenile sponge and you are looking at the spicules that form the overall framework.

**A. David Scarfe PhD, DVM, MRSSAf**



Do you know what this is? If so, send us an email.



# THE AQUATIC VETERINARIAN

Volume 7, Number 1

GRAND ROUNDS CASES

First Quarter 2013

## Cataracts in Cichlids

Has anyone had any success in treating cataracts in cichlids? I am going out to a case on Monday, not sure of the cause as yet, it does also have hole in the head.

Would hardness play a part in corneal opacity? All other water parameters are within normal limits. Fish are housed in a home aquarium, 8ft x 2ft x 2ft. Regards,

**Sandy Ypelaan**

[cypelaan1@optusnet.com.au](mailto:cypelaan1@optusnet.com.au)

The Visiting Vet

My approach will be to determine first if the case is eye lens cataract or corneal opacity. If it is real cataract, I am not sure if this is reversible, but corneal opacity can be. Malnutrition and poor water quality are common causes of corneal opacity, but also infections with flagellates or larval trematodes. I have seen multiple cases of cataracts and hole-in-the-head in juvenile salmonids associated with *Flavobacteria* and they were successfully treated with Aquaflor.

**Mohamed Faisal**

[fishdoonline@gmail.com](mailto:fishdoonline@gmail.com)

## Cataracts in Rainbowfish

The client comes on Saturday for first time to me and asked me what the reason is for the opaque eyes. Client has these *Melanotaenia boesemani* rainbowfish for 20 years and never saw this phenomenon before. There are 40 fish in an aquarium of 2 meter length. Almost all fish are affected on both eyes.

Please, need some ideas what it can be. Thanks in advance

**Greta Van de Sompel**

[www.vdcvds.be](http://www.vdcvds.be)

If this is bilateral and widespread in all or most fish, it may be worthwhile investigating further. If this is indeed cataracts, lens histopathology (if possible) should be easy to identify if it is on the front, back, or throughout the lens – that may give a hint to the etiology. Generalized cataracts in Scandinavian (mainly Norway) farmed salmon are suggested to be a fairly common problem. Although the cause in salmon has not been definitively identified, I would suspect in your case it may be meta-

bolic and related to nutrition (e.g. strong oxidants like vitamin C). The other common links in humans and terrestrial animal (age, congenital/heredity, medication [e.g. corticosteroids], trauma) should not show up in bilateral cataracts in all or most of the fish.

**A. David Scarfe PhD, DVM, MRSSAf**

[dscarfe@avma.org](mailto:dscarfe@avma.org)

Indeed, I found an article 'Looking fish in the eye—cataracts as a problem in fish farming'. It says about the same as you do. I didn't know it was a problem in salmon.

Irreversible if it is nutritional I suppose? I'll investigate them on Saturday, in the article they speak about parasites *Diplostomum* [eyeflukes].

Don't know if the owner will want to sacrifice one for histopathology, though.

**Greta Van de Sompel**

[www.vdcvds.be](http://www.vdcvds.be)

Perhaps a diagnostic lab near you could do the histopath and, if this is a nutritional problem, a good history from the client might allow you to identify a solution.

**A. David Scarfe PhD, DVM, MRSSAf**

[dscarfe@avma.org](mailto:dscarfe@avma.org)

UV light in the aquarium too strong?

Could be UV damage, water temperature, salinity, trauma or just epithelial hyperplasia.

**Dr Richmond Loh**

[thefishvet@gmail.com](mailto:thefishvet@gmail.com)

Years back we had cases of flashlight fish with cataracts. I brought in an ophthalmologist to read the histo with me. In those cases it was thought perhaps gas bubble disease had affected vascular supply to the lens causing a "nutritional" cataract -- in that low circulation caused the lens to get less nutrition. It was hypothesized that the fish were brought up from the deep too fast, causing gas emboli in vessels feeding the lens. I'm just providing another differential for you all to add to the list.

In your case, I would seek for either nutritional (to the fish) issues or - parasites - but if almost all fish have the cataracts I doubt it is parasites.

**Renate Reimschuessel**

[renate.reimschuessel@fda.hhs.gov](mailto:renate.reimschuessel@fda.hhs.gov)



## PUBLIC HEALTH AND SEAFOOD SAFETY

### Identification of *Anisakis* species (Nematoda: Anisakidae) in marine fish hosts from Papua New Guinea

M. Koinari, M, S Karl, A Elliot, U Ryan & AJ Lymbery (2013). *Vet. Parasitol.*, 193(1-3): 126-133.

#### Abstract

The third-stage larvae of several genera of anisakid nematodes are important etiological agents for zoonotic human anisakiasis. The present study investigated the prevalence of potentially zoonotic anisakid larvae in fish collected on the coastal shelves off Madang and Rabaul in Papua New Guinea (PNG) where fish represents a major component of the diet. Nematodes were found in seven fish species including *Decapterus macarellus*, *Gerees oblongus*, *Pinjalo lewisi*, *Pinjalo pinjalo*, *Selar crumenophthalmus*, *Scomberomorus maculatus* and *Thunnus albacares*. They were identified by both light and scanning electron microscopy as *Anisakis* Type I larvae. Sequencing and phylogenetic analysis of the ribosomal internal transcribed spacer (ITS) and the mitochondrial cytochrome C oxidase subunit II (*cox2*) gene identified all nematodes as *Anisakis typica*. This study represents the first in-depth characterisation of *Anisakis* larvae from seven new fish hosts in PNG. The overall prevalence of larvae was low (7.6%) and no recognised zoonotic *Anisakis* species were identified, suggesting a very low threat of anisakiasis in PNG.

### Population Structure of Three Species of *Anisakis* Nematodes Recovered From Pacific Sardines (*Sardinops sagax*) Distributed Throughout the California Current System

Baldwin RE, MB Rew, ML Johansson, MA Banks & KC Jacobson (2011). *J. Parasitol.*, 97(4):545-554.

#### Abstract

Members of the Anisakidae are known to infect over 200 pelagic fish species and have been frequently used as biological tags to identify fish populations. Despite information on the global distribution of *Anisakis* species, there is little information on the genetic diversity and population structure of this genus, which could be useful in assessing the stock structure of their fish hosts. From 2005 through 2008, 148 larval anisakids were recovered from

Pacific sardine (*Sardinops sagax*) in the California Current upwelling zone and were genetically sequenced. Sardines were captured off Vancouver Island, British Columbia in the north to San Diego, California in the south.

Three species, *Anisakis pegreffii*, *Anisakis simplex* 'C', and *Anisakis simplex* s.s., were identified with the use of sequences from the internal transcribed spacers (ITS1 and ITS2) and the 5.8s subunit of the nuclear ribosomal DNA. The degree of nematode population structure was assessed with the use of the cytochrome c oxidase 2 (*cox2*) mitochondrial DNA gene. All 3 *Anisakis* species were distributed throughout the study region from 32°N to 50°N latitude.

There was no association between sardine length and either nematode infection intensity or *Anisakis* species recovered. Larval *Anisakis* species and mitochondrial haplotype distributions from both parsimony networks and analyses of molecular variance revealed a panmictic distribution of these parasites, which infect sardines throughout the California Current ecosystem. Panmictic distribution of the larval *Anisakis* spp. populations may be a result of the presumed migratory pathways of the intermediate host (the Pacific sardine), moving into the northern portion of the California Current in summer and returning to the southern portion to overwinter and spawn in spring. However, the wider geographic range of paratenic (large piscine predators), and final hosts (cetaceans) can also explain the observed distribution pattern.

As a result, the recovery of 3 *Anisakis* species and a panmictic distribution of their haplotypes could not be used to confirm or deny the presence of population subdivision of Pacific sardines in the California Current system.

### Injuries, envenomations and stings from exotic pets.

Warwick C & C Steedman (2012). *J. Roy. Soc. Med.*, 105(7):296-299.

#### Abstract

A variety of exotic vertebrate and invertebrate species are kept as 'pets' including fishes, amphibians, reptiles, birds, mammals (for example, primates, civets, and lions), and invertebrates (for example spiders, scorpions, and centipedes), and ownership of some of these animals is rising.



Data for 2009-2011 suggest that the number of UK homes with reptiles rose by approximately 12.5%. Recent surveys indicated that they might be present in around 18.6% of homes (equal to approximately 42 million animals of which around 40 million are indoor or outdoor fish). Many exotic 'pets' are capable of causing injury or poisoning to their keepers and some contacts prove fatal.

We examined NHS Health Episode Statistics for England using selected formal categories for hospital admissions and bed days for 2004-2010 using the following categories of injury, envenomation or sting; bitten or struck by crocodile or alligator; bitten or crushed by other reptiles: contact with venomous snakes and lizards; contact with scorpions. These data conservatively show a total of 760 full consultation episodes, 709 admissions and 2,121 hospital bed days were associated with injuries from exotic pets.

Greater awareness of relevant injuries and medical sequelae from exotic pet keeping may help medics formulate their clinical assessment and advice to patients.

## Detection of Avian Influenza (H5N1) In Some Fish and Shellfish from Different Aquatic Habitats across Some Egyptian Provinces.

Eissa AE, HA Hussein & MM Zaki (2012). *Life Sci. J.*, 9(3):2702-2712 (An open access publication available at <http://tinyurl.com/aj3dzth>).

### Abstract

The global climatic changes impact on air, water and earth could extend the scope of Avian Influenza (H5N1) virus to another broad sector of creatures including aquatic animals, especially those with direct relationship to aquatic birds. In the current study, Avian Influenza virus (H5N1) was detected in hemolymph of the Red Swamp crayfish (*Procambrus clarkii*) from three different provinces across the Nile Delta.

Most of the positive cases were from the neighborhood of migratory bird natural stop stations. The virus was also detected in the Mediterranean Cone Shell *Conus mediterraneus* and the Pufferfish *Lagocephalus sceleratus* (Gmelin, 1789) during its course of invasion to the Mediterranean Sea. Two out of three poultry manure samples collected prior to earthen pond fertilization at three different localities were proved to be positive for the H5N1 virus. Tissue / mucous samples collected

from earthen pond raised tilapias were negative for the virus. Catfish (*Clarias gariepinus*) has presented a striking model for aquatic species carrying the virus in their blood.

The current results are suggestive for an important epidemiological role played by aquatic animals in spread of avian influenza (H5N1) virus across the Egyptian aquatic habitat.

## High Prevalence of Multidrug-Tolerant Bacteria and Associated Antimicrobial Resistance Genes Isolated from Ornamental Fish and Their Carriage Water

David W. Verner-Jeffreys DW, TJ Welch, T Schwarz, MJ. Pond, MJ Woodward, SJ Haig, GSE Rimmer, E Roberts, V Morrison & C Baker-Austin (2009). *PLoS ONE*, 4(12): e8388. (An open access publication available at <http://tinyurl.com/d2bs3sy>.)

### Abstract

**Background:** Antimicrobials are used to directly control bacterial infections in pet (ornamental) fish and are routinely added to the water these fish are shipped in to suppress the growth of potential pathogens during transport.

**Methodology/Principal Findings:** To assess the potential effects of this sustained selection pressure, 127 *Aeromonas* spp. isolated from warm and cold water ornamental fish species were screened for tolerance to 34 antimicrobials. Representative isolates were also examined for the presence of 54 resistance genes by a combination of miniaturized microarray and conventional PCR. Forty-seven of 94 *Aeromonas* spp. isolates recovered from tropical ornamental fish and their carriage water were tolerant to 15 antibiotics, representing seven or more different classes of antimicrobial. The quinolone and fluoroquinolone resistance gene, *qnrS2*, was detected at high frequency (37% tested recent isolates were positive by PCR). Class 1 integrons, *IncA/C* broad host range plasmids and a range of other antibiotic resistance genes, including *floR*, *blaTEM21*, *tet(A)*, *tet(D)*, *tet(E)*, *qacE2*, *sul1*, and a number of different dihydrofolate reductase and aminoglycoside transferase coding genes were also detected in carriage water samples and bacterial isolates.

**Conclusions:** These data suggest that ornamental fish and their carriage water act as a reservoir for both multi-resistant bacteria and resistance genes.

# THE AQUATIC VETERINARIAN

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LITERATURE REVIEW

First Quarter 2013



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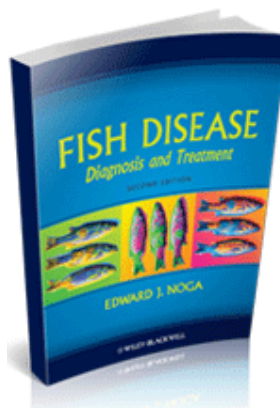
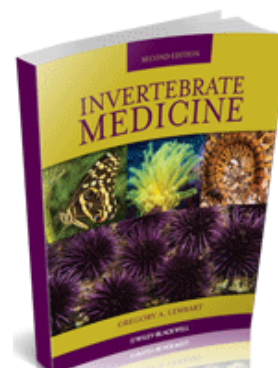
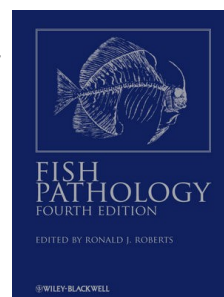
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## Imported ornamental fish are colonized with antibiotic-resistant bacteria

S Rose, R Hill, L E Bermudez, T Miller-Morgan  
Article first published online: 7 JAN 2013  
Blackwell Publishing Ltd  
*Journal of Fish Diseases*

### Abstract

There has been growing concern about the overuse of antibiotics in the ornamental fish industry and its possible effect on the increasing drug resistance in both commensal and pathogenic organisms in these fish. The aim of this study was to carry out an assessment of the diversity of bacteria, including pathogens, in ornamental fish species imported into North America and to assess their antibiotic resistance.

Kidney samples were collected from 32 freshwater ornamental fish of various species, which arrived to an importing facility in Portland, Oregon from Colombia, Singapore and Florida. Sixty-four unique bacterial colonies were isolated and identified by PCR using bacterial 16S primers and DNA sequencing. Multiple isolates were identified as bacteria with potential to cause disease in both fish and humans.

The antibiotic resistance profile of each isolate was performed for nine different antibiotics. Among them, cefotaxime (16% resistance among isolates) was the antibiotic associated with more activity, while the least active was tetracycline (77% resistant). Knowing information about the diversity of bacteria in imported ornamental fish, as well as the resistance profiles for the bacteria will be useful in more effectively treating clinically infected fish, and also potential zoonoses in the future.

Link: <http://onlinelibrary.wiley.com/doi/10.1111/jfd.12044/abstract>

## More rapid and severe disease outbreaks for aquaculture at the tropics: implications for food security

Leung TLF & AE Bates (2013). *J. App. Ecol.*, 50: 215–222. (Open access publication accessible at <http://tinyurl.com/bqq8f8j>)

### Abstract

Aquaculture is replacing capture fisheries in supplying the world with dietary protein. Although disease is a major threat to aquaculture production,

the underlying global epidemiological patterns are unknown. We analysed disease outbreak severity across different latitudes in a diverse range of aquaculture systems. Disease at lower latitudes progresses more rapidly and results in higher cumulative mortality, in particular at early stages of development and in shellfish. Tropical countries suffer proportionally greater losses in aquaculture during disease outbreaks and have less time to mitigate losses.

Synthesis and applications: Disease can present a major problem for food production and security in equatorial regions where fish and shellfish provide a major source of dietary protein. As the incidences of some infectious diseases may increase with climate change, adaptation strategies must consider global patterns in disease vulnerability of aquaculture and develop options to minimize impacts on food production.

## Modelling salmon lice, *Lepeophtheirus salmonis*, reproduction on farmed Atlantic salmon, *Salmo salar* L.

Stormoen M, E Skjerve & A Aunsmo (2012). *J. Fish Dis.*, 36 (1):25-33.

### Abstract

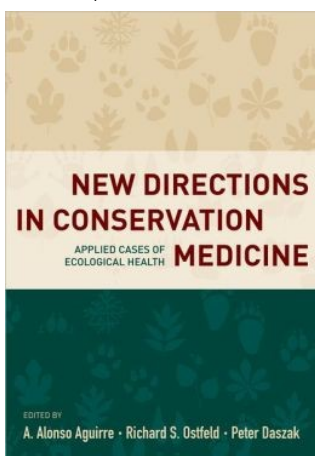
The aim of this study was to model sea lice levels and the effect on reproduction by a stochastic simulation model and to evaluate the uncertainty of lice estimates based upon counts. Two empirical data sets were examined to parameterize the models. An overall fit of the data to the Poisson distribution was found and thus was used as the base of the stochastic models. In the model, salmon lice reproduction is not linear with the number of adult females and at low lice loads a smaller proportion of the adult female lice will reproduce.

Depending on the variance structure, it was estimated that between 40% and 60% of the adult female lice will reproduce at an abundance of 0.5 adult females per fish. Lice counts, especially when examining few fish at low lice loads, are uncertain and at a true abundance of 0.1 one may count between 0 and 5 lice when examining 10 fish. Understanding the dynamics of sea lice reproduction is a key factor in the development of sustainable control strategies.



**Book Review:  
New Directions in Conservation Medicine -  
Applied Cases of Ecological Health**

Edited by A. Alonso Aguirre, Richard Ostfeld  
and Peter Daszak  
Oxford University Press Hardback, 672 pages.  
May 2012  
Price: \$89.95



This is a fascinating text that might be of those interested in new thinking about conservation medicine, and the “One Health” concept. One Health has at its core three intertwined legs – animal health, human health and environmental health. Unquestionably, how these three fields are eventually brought together as a unified concept for implementation of clear strategies will be the basis for the long-term survival of world populations.

As the publisher describes, in recent years, species and ecosystems have been threatened by many anthropogenic factors manifested in local and global declines of populations and species. Although many consider conservation medicine an emerging field, the concept is the result of the long evolution of transdisciplinary thinking within the health and ecological sciences and the better understanding of the complexity within these various fields of knowledge.

Conservation medicine was born from the cross fertilization of ideas generated by this new transdisciplinary design. It examines the links among changes in climate, habitat quality, and land use; emergence and re-emergence of infectious agents, parasites and environmental contaminants; and maintenance of biodiversity and ecosystem functions as they sustain the health of plant and animal communities including humans.

During the past ten years, new tools and institutional initiatives for assessing and monitoring ecological health concerns have emerged: landscape epidemiology, disease ecological modeling and web-based analytics. New types of integrated ecological health assessment are being deployed; these efforts incorporate environmental indicator

studies with specific biomedical diagnostic tools.

Other innovations include the development of non-invasive physiological and behavioral monitoring techniques; the adaptation of modern molecular biological and biomedical techniques; the design of population level disease monitoring strategies; the creation of ecosystem-based health and sentinel species surveillance approaches; and the adaptation of health monitoring systems for appropriate developing country situations.

*New Directions of Conservation Medicine* addresses these issues with relevant case studies and detailed applied examples. It begins to challenge the notion that human health is an isolated concern removed from the bounds of ecology and species interactions. Human health, animal health, and ecosystem health are moving closer together and at some point, it will be inconceivable that there was ever a clear division.

The book’s features include a detailed review of emerging infectious diseases and pathogens from insects, plants and vertebrates. But it also addresses the issues of assessing and monitoring ecological health concerns, includes relevant case studies and detailed applied examples and is applicable to a broad range of disciplines. Several chapters may be of particular interest to aquatic veterinarians, but those should be read in context of other chapters.

This book is a fascinating exploration of many ideas and contributions are grouped together under five distinct sections, including the following:

**Part One: Conservation Medicine:  
Ecological Health in Practice**

- Conservation Medicine: Ontogeny of an Emerging Discipline
- Ecohealth: Connecting Ecology, Health, and Sustainability
- One Health, One Medicine
- Biodiversity and Human Health
- An Ecosystem Service of Biodiversity: The Protection of Human Health Against Infectious Disease
- Parasite Conservation, Conservation Medicine and Ecosystem Health
- Stress and Immunosuppression as Factors in the Decline and Extinction of Wildlife Populations: Concepts, Evidence, and Challenges

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## **Part Two: Anthropogenic Change and Conservation Medicine**

Climate Change & Infectious Disease Dynamics  
Wildlife Health in a Changing North: A Model for  
Global Environmental Change  
Habitat Fragmentation and Infectious Disease  
Ecology  
Wildlife Trade and the Spread of Disease  
Bushmeat and Infectious Disease Emergence  
Human Migration, Border Controls, and Infectious  
Disease Emergence

## **Part Three: Emerging Infectious Diseases and Conservation Medicine**

Are Bats Exceptional Viral Reservoirs?  
SARS: A Case Study for Factors Driving Disease  
Emergence  
H5N1 Highly Pathogenic Avian Influenza: Break-  
ing the Rules in Disease Emergence  
Bartonellosis: An Emerging Disease of Humans,  
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Brucella ceti and Brucella pinnipedialis Infections  
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From Protozoan Infection in Monarch Butterflies  
to Colony Collapse Disorder in Bees: Are  
Emerging Infectious Diseases Proliferating in  
the Insect World?  
Fungal Diseases in Neotropical Forests Disturbed  
by Humans  
Emerging Infectious Diseases in Fisheries and  
Aquaculture  
Southern Sea Otters as Sentinels for Land-Sea  
Pathogens and Pollutants

## **Part Four: Ecotoxicology and Conservation Medicine**

Ecotoxicology: Bridging Wildlife, Humans, and  
Ecosystems  
Wildlife Toxicology: Environmental Contaminants  
and Their National and International Regula-  
tion  
Marine Biotoxins: Emergence of Harmful Algal  
Blooms as Health Threats to Marine Wildlife  
Beluga from the St. Lawrence Estuary: A Case  
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## **Part Five: Place-Based Conservation Medicine**

Sense and Serendipity: Conservation and Man-  
agement of Bison in Canada  
Pathogens, Parks, and People: The Role of Bo-

vine Tuberculosis in South African Conserva-  
tion

Disease Ecology and Conservation of Ungulates,  
Wild Rabbits, and the Iberian Lynx in the  
Mediterranean Forest

The Kibale EcoHealth Project: Exploring Con-  
nections Among Human Health, Animal Health,  
and Landscape Dynamics in Western  
Uganda

Conservation Medicine in Brazil: Case Studies of  
Ecological Health in Practice

Linking Conservation of Biodiversity and Culture  
with Sustainable Health and Wellness: The  
Itzamma Model and Global Implications for  
Healing Across Cultures

Biological Diversity and Human Health: Using  
Plants and Traditional Ethnomedical Knowl-  
edge to Improve Public Health and Conser-  
vation Programs in Micronesia

## **Part Six: Applied Techniques of Conservation Medicine**

Human Health in the Biodiversity Hotspots: Appli-  
cations of Geographic Information System  
Technology and Implications for Conserva-  
tion

Determining When Parasites of Amphibians Are  
Conservation Threats to their Hosts: Meth-  
ods and Perspectives

Strategies for Wildlife Disease Surveillance

Wildlife Health Monitoring Systems in North  
America: From Sentinel Species to Public  
Policy

Epidemiologic Investigation of Infectious Patho-  
gens in Marine Mammals: The Importance of  
Serum Banks and Statistical Analysis

Sorta Situ : The New Reality of Management  
Conditions for Wildlife Populations in the Ab-  
sence of "Wild" Spaces

Modeling Population Viability and Extinction Risk  
in the Presence of Parasitism

Using Mathematical Models in a Unified Ap-  
proach to Predicting the Next Emerging In-  
fectious Disease

Reviewed by **A. David Scarfe PhD, DVM, MRSSAf**

# THE AQUATIC VETERINARIAN

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NEWS AND VIEWS

First Quarter 2013

## Agency says GE salmon unlikely to harm U.S. environment

Posted on January 30, 2013

A Massachusetts-based company's salmon, genetically engineered to grow more quickly than wild salmon, are unlikely to escape and damage environments in the U.S., federal officials said in two reports provided in December 2012.

The documents published by the US Food and Drug Administration indicate the agency did not consider how the salmon could affect the environment in Canada, where AquaBounty Technologies would produce its salmon eggs, or Panama, where the salmon would be grown to market size, other than as needed to identify any potential effects on U.S. environments. The assessment does note that the salmon, known as AquaAdvantage salmon, would be effectively sterile and grown in land-based, freshwater culture facilities, not in the ocean net pens or cages used to farm other fish.

AquaBounty claims that its triploid female Atlantic salmon grow to market size in half the time of conventional Atlantic salmon. The company uses an rDNA construct that contains gene-coding sequences from ocean pout and Chinook salmon.

The FDA is evaluating the rDNA construct as a new animal drug because of its effects on the fish, and the environmental assessment is part of that evaluation.

The FDA noted in its draft environmental assessment that, if the agency denied AquaBounty's drug application, the company could still produce and sell the salmon outside the U.S., making the effects on the U.S. environment "highly uncertain."

"Because production of AquaAdvantage Salmon would be possible at any number of locations worldwide, under different containment conditions, and potentially within areas where native Atlantic salmon are present, there are too many variables and unknowns to perform a comprehensive assessment and make any predictions with respect to potential environmental impacts on the United States," the assessment states.

The documents and instructions on providing comments are available under docket number FDA-2011-N-0899 at [www.regulations.gov](http://www.regulations.gov).

## Will the Zebrafish transform medicine?

Jan 21, 2013

By Virginia Hughes

Nico Katsanis, a Duke University geneticist who hunts down the causes of rare illnesses, is one of a growing number of researchers choosing to work with zebrafish (*Danio rerio*) instead of rodents. Since scientists learned to selectively mutate zebrafish DNA in 1988—giving them the ability to turn the species into models of human diseases—the number of biomedical zebra-fish papers has skyrocketed, from 26 to 2,100 last year. The nonprofit Zebrafish International Resource Center, which sells 2,608 different genetically modified strains to researchers, lists 921 academic labs and companies that use the fish.

"The field is on fire," says Leonard Zon of Harvard Medical School. Zon's lab, for example, has used fish models to study skin cancer, blood diseases, and stem cells. Others have created fish with DNA mutations linked to narcolepsy, muscle disorders, and the large head size associated with autism.

To be sure, rodents still outnumber zebrafish in medical research labs. In 2010, biomedical research papers that used mice or rats were 10 times as common as those that used any other lab animal, and some biological processes—complex brain disorders, say, or anything involving lungs—are best studied in mammals rather than fish. But for most other experiments, from watching tumors develop to screening for new drugs, zebrafish are gaining ground.

Zebrafish offer three major advantages over rodents. First, they quickly make more zebrafish. A female's eggs spawn hundreds of embryos three days after fertilization; mice take three weeks to produce just 10 pups. They are also inexpensive to maintain—about 6.5 cents a day for a tank of a few dozen fish, compared with 90 cents for five mice in a cage. Finally, because larval fish are transparent, researchers can literally watch their organs grow, which makes them especially good for studying problems with organ development. Within the next five years, researchers will be using zebrafish to find treatments for rare diseases, Katsanis says.

See full story:

<http://www.popsci.com/science/article/2013-01/will-fish-transform-medicine>



# THE AQUATIC VETERINARIAN

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NEWS AND VIEWS

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## New study detects deadly fungus in Southeast Asia's amphibian trade

March 6, 2013

Phys.org

A team of scientists led by the Wildlife Conservation Society (WCS) and the National University of Singapore (NUS), revealed in a new study, for the first time, the presence of the pathogenic chytrid fungus (*Batrachochytrium dendrobatidis*) in amphibians sampled in Singapore. And the American bullfrog may be a central player in the spread of the disease. The study appears in the current issue of the journal *EcoHealth*, and is the first to consider the role that Southeast Asia's commercial trade plays in the spread of amphibian pathogens.

Demand for amphibians through local and international trade is high and fueled by use of frogs as pets, food, bait, and as a source of traditional 'medicine.' More than 40 percent of [amphibian species](#) are in decline globally due, not only to chytrid fungus, but also overharvesting, competition from invasive species, [habitat loss](#), pollution, and [climate change](#).

In the study, scientists collected samples from 2,389 individual animals in Lao PDR, Cambodia, Vietnam, and Singapore at 51 different sites including farms, locally supplied markets, pet stores, and from the wild.

The molecular testing of samples was led by Dr. Tracie Seimon at WCS's Molecular Diagnostic Laboratory at the [Bronx Zoo](#). Results showed that frogs from Lao PDR and Vietnam tested negative for chytrid. In Cambodia, one frog intended for food tested positive. In addition, 74 animals in Cambodia and Vietnam were screened for ranavirus and tested negative, suggesting that these specific pathogens are not yet a conservation threat in species tested from these countries.

In Singapore, however, 13 samples tested positive for chytrid and represent the first report of chytrid in the territory. Eleven of those samples were collected from four pet stores and the remaining two were taken from amphibians in the wild.

The World Organization for Animal Health (OIE) requires its 174 member countries, which include the four countries in this study, to conduct surveillance for chytrid fungus, report confirmed cases, and implement measures to control their spread.

See full story:

<http://phys.org/news/2013-03-deadly-fungus-southeast-asia-amphibian.html>

## 'Red Tide' Is Killing Florida's Manatees

11 March 2013

Marc Lallanilla, Assistant Editor

[LiveScience](#)

The toxic algae that cause Florida's notorious "red tides" is killing the state's endangered manatees (*Trichechus manatus*) in record-breaking numbers, researchers report. In 1996, 151 manatees were killed by an outbreak of [red tide](#), and experts say that record has now been equaled — and it's only March. The toxin persists in the manatees' ecosystem even after the algal bloom fades, so the die-off is expected to continue for months.

"This is probably going to be the worst die-off in history," Martine DeWit, a veterinarian with Florida's marine mammal pathology laboratory, told the [Tampa Bay Times](#).

The algae, known as *Karenia brevis*, is found throughout the Gulf of Mexico. When populations of *K. brevis* explode, as is happening now on Florida's west coast, the blooms of algae turn the water a rusty red color and result in what's known as a red tide. The microscopic algae also contain a potent neurotoxin that can cause gastric and neurological problems in animals, including [squid](#), birds, fish, [manatees](#) and humans. When manatees ingest the algae, the neurotoxin shuts down the marine mammal's ability to breathe, so they drown underwater.

"They're basically paralyzed, and they're comatose," Virginia Edmonds, animal care manager for the Lowry Park Zoo in Tampa, told the Tampa Bay Times. "They could drown in 2 inches of water."

Though the [manatee population](#) is threatened by the latest outbreak of red tide, boating remains the most common cause of death for the endangered mammals: Motorboats killed about 800 manatees from 1995 to 2005, NBC.

Email [Marc Lallanilla](#)

Original article on [LiveScience.com](#).

Manatee photo from [Wikipedia](#)



## Anti-anxiety drug found in rivers makes fish more aggressive

March 5, 2013

[Nature.com](#)

Behaviour changes result from benzodiazepine levels similar to those in the environment. Perch can accumulate high levels of oxazepam when the anti-anxiety drug makes it into their river water. Tiny amounts of a common anti-anxiety medication — which ends up in wastewater after patients pass it into their urine — significantly alters fish behaviour, according to a new study. The drug makes timid fish bold, antisocial and voracious, researchers have found.

Oxazepam belongs to the class of drugs called benzodiazepines, the most widely prescribed anxiety drugs, and is thought to be highly stable in aquatic environments. It acts by enhancing neuron signals that damp down the brain's activity, helping patients to relax. An article in *Science* now places the drug on a growing list of pharmaceutical products that escape wastewater treatment unscathed and may be affecting freshwater communities. A chemical found in contraceptive pills, known as 17- $\beta$ -estradiol, and the antidepressant drug fluoxetine (Prozac) have been shown to alter behaviour in the fathead minnow (*Pimephales promelas*), and the popular anti-inflammatory drug ibuprofen reduces courtship behaviour in male zebrafish (*Danio rerio*).

Taken together, the evidence suggests that tests of possible pollutants must go beyond merely cataloguing fatal or highly toxic doses, says Todd Royer, an ecologist at Indiana University in Bloomington. "This study really highlights the importance of non-lethal effects," he says. Even if a drug doesn't kill or cause acute toxicity, it could be altering "community structure and other ecosystem processes", he explains.

Non-medicated perch are timid, preferring to stick to familiar territory and occasionally peeking out into the wider tank. The medicated fish, however, embraced the unknown, readily swimming into uncharted territory. And whereas non-medicated perch swim towards other fish of the same species, the medicated perch turned away from their compatriots. Fish exposed to oxazepam were also quicker to feast on zooplankton introduced into the tanks.

[Original web page at Nature.com](#)

## Toxic turtles: Long-lasting chemicals could be harming sea turtles

March 14, 2013

By **Brett Israel**

Staff Writer, Environmental Health News

From the moment they are born, sea turtles fight to survive. Buried alive, they dig themselves out and evade hungry crabs and birds as they crawl to the ocean, where they begin a long and treacherous migration. One out of 1,000 will survive into adulthood. And those that do will bear a toxic burden. Scientists are discovering that sea turtles, long ignored by toxicologists who study wildlife, are highly contaminated with industrial chemicals and pesticides.

Decimated by climate change, poaching, accidental snaring and ocean trash, all U.S. species of sea turtles are protected by the Endangered Species Act, which makes studying them difficult. "We really have just barely touched the tip of the iceberg," said Jennifer Keller, a marine biologist at the Hollings Marine Lab in Charleston, S.C. She is the top expert on pollution in sea turtles.

Sea turtles have some industrial compounds in their blood nearing levels that damage marine mammals. Keller's lab last year measured per-fluorochemicals (PFCs) in the [blood of five sea turtle species](#) off the southeastern U.S. coast, and her calculations suggest that the turtles' potential risk for toxic effects is high.

Persistent organic pollutants magnify every step up a food web to top predators such as dolphins, seals and sea lions. Killer whales are the [most contaminated wild creatures](#) on the planet. Sea turtles vary in their pecking order, and chemicals build up in them accordingly. Because some can live to 100 years old, they can accumulate high levels of contaminants.

In leatherbacks, research has shown that some contamination is [passed on to their eggs](#). PCBs and flame retardants correlate with smaller turtle eggs, according to a recent study by Keller. Research in birds has shown similar effects.

All five species of sea turtles in Keller's study were at risk for potential immune suppression, according to the researchers' estimated margins of safety. Regulatory agencies use these margins of safety to determine potential risk of toxicity.

See full article:

[.http://www.environmentalhealthnews.org/ehs/news/2013/toxic-turtles](http://www.environmentalhealthnews.org/ehs/news/2013/toxic-turtles)

# THE AQUATIC VETERINARIAN

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## **Fish found that gorges, starves itself to survive**

March 20, 2013

By **Sandi Doughton**

Seattle Times science reporter

Living in a remote watershed on the Gulf of Alaska where food is abundant for only five weeks of the year, the Dolly Varden fish survive by expanding and shrinking their digestive tracts in a way that humans trying to lose weight might envy.

Two University of Washington graduate students discovered that Dolly Varden in Alaska feast on sockeye-salmon eggs for one month, then go without eating the rest of the year. The key is being able to grow a big stomach when they need it.

The results demonstrate the remarkable resilience of some fish populations, and could help wildlife managers to save bull trout, a closely related species that is threatened in the Pacific Northwest, said Jonathan Armstrong, co-author of a study published in the *Journal of Animal Ecology*.

Working in Alaska's Chignik watershed, Armstrong and fellow fisheries doctoral student Morgan Bond focused on the Dolly Varden. With bright pink spots and an orange belly, the fish reportedly got their name from a character in a Charles Dickens novel who favored brightly colored dresses.

The Chignik watershed is famous for its sockeye-salmon run. Up to a half-million of the crimson fish return like clockwork in late July to spawn, turning the river red. For Dolly Varden, the sockeye's arrival is like ringing the dinner bell. They gobble down salmon eggs unearthed in the spawning frenzy, each eating up to half a pound a day.

But by late August, the feast is over. And the rivers and lakes in the Chignik area are so cold and barren that there are few insects or other prey for the Dolly Varden to feed on during the rest of the year, Bond said. He and Armstrong wondered how the fish could survive under such extreme conditions.

The pair surveyed the river in spring, before the sockeye returned, and found it populated with very skinny Dolly Varden. When they cut open some of the fish, they found their digestive systems were tiny, too. Fish captured after the salmon-egg buffet weighed up to 50 percent more, and some parts of their digestive tracts were four times bigger.

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For full text, see: [The Seattle Times](#)

## **New York aquarium rebounds, rebuilds after Superstorm Sandy**

March 27, 2013

Associated Press

By **Jennifer Peltz**

The New York Aquarium has cherished its big-city setting by the sea for half a century. But the ocean that is the aquarium's lifeblood dealt it a shattering blow last fall. Sandy's surge overran carefully calibrated tanks with oily, debris-filled water, knocked out even backup power to all the exhibits and made it impossible to check on some of them for days. Managers contemplated shipping animals away and wondered whether the institution itself could survive in its spot on Coney Island. Five months later, more than 80% of the collection is intact, and visitors should be able to see walruses, angelfish, otters and others when about half the aquarium reopens late spring. A planned expansion remains on track, now coupled with rebuilding and floodproofing an institution that aims to be an object lesson in enduring on the shore.

"I don't think we could abandon this facility. Not that we didn't think about it — we thought through everything," aquarium Director Jon Forrest Dohlin said this week as he stood amid pipes and cables in a now-empty jellyfish exhibit. "We want to be here, and we also want to be able to talk to the community about what we did, how we handled this, and how the city...can start to look toward the future of living in a this coastal environment."

As he walked through the 14-acre grounds, penguins watched like squat sentries from their outdoor habitat. Walruses snoozed as sea lions arced through the air on their trainers' cues, staying in practice for shows to resume in a few months. Angelfish and other tropical species shimmered around a coral reef and hefty pacu, a fruit-eating piranha relative, hovered in an Amazonian display in the one building where exhibit space wasn't flooded. But the effects of the Oct. 29 storm were still starkly visible elsewhere. The floor was torn out of a building that houses jellyfish, seahorses, lungfish and other unusual creatures. Many were still there but set to start moving next month to other aquariums while their facility is rebuilt. The open pool in front of it was drained dry; it housed hundreds of freshwater koi that died in the saltwater surge.

For full article, see: <http://www.freep.com/article/20130327/BUSINESS07/130327013/New-York-aquarium-rebounds-rebuilds-after-Sandy->



# THE AQUATIC VETERINARIAN

Volume 7, Number 1 LEGISLATIVE & REGULATORY ISSUES First Quarter 2013



## Statutory and Regulatory Authority for Aquatic Veterinary Medicine

With the rapid growth of aquaculture and the number of aquatic disease outbreaks around the world, there is a critical need for identifying, recognising and delegating appropriate responsibilities to veterinarians and non-veterinarian para-professionals in National and International aquatic animal health and welfare programmes, similar to terrestrial programmes. It is equally important to recognise the education, knowledge, skills, experience and responsibilities afforded veterinarians and non-veterinary para-professionals that constitute a veterinary workforce. Throughout the world, graduating from recognised veterinary degree-awarding institutions and registration or licensing by National, Provincial, State or other accreditation bodies that regulate the practice veterinary medicine, confers legal and accountability responsibilities on the recipient.

With the increasing numbers of veterinarians now involved with aquatic veterinary medicine, it is therefore imperative for National and International bodies to recognise, differentiate and acknowledge the authority of aquatic veterinarians and para-professionals in legislation and regulations. However, the World Veterinary Association and the World Aquatic Veterinary Medical Association recognise that in many countries, particularly those in Africa and some parts of Asia, the number of veterinarians involved with aquatic animal health and welfare may not be currently sufficient to fulfill all aquatic animal health and welfare statutory and regulatory needs, or provide adequate veterinary services to aquatic animal owners and aquaculture industries.

In order to meet and satisfy for veterinary responsibility and accountability in National and International aquatic animal health and welfare regulatory programmes, actions and activities, the World Veterinary Association and the World Aquatic Veterinary Medical Association encourage those countries that have sufficient numbers of aquatic veterinarians to incorporate the recognition and authority

of these veterinarians into legislation and regulations.

As a temporary measure and until a sufficient number of aquatic veterinarians are identified, those countries that initially delegate some of these responsibilities to fisheries biologists and other non-veterinarian para-professionals should hold these individuals accountable at the same level as veterinarians. When sufficient numbers of aquatic veterinarians are available, legislation, regulations and International standards should clearly identify the supportive functions of aquatic veterinary non-veterinarian para-professionals, and ensure that veterinary services should be only performed under the supervision of a qualified aquatic veterinarian.

\* A veterinary workforce as made up of veterinarians and non-veterinarians (para-professionals) who collectively provide the services needed to ensure the health and welfare of animals, and implement optimal measures for the prevention, control and eradication of animal diseases. In most countries individuals lacking a recognised veterinary degree are prohibited from being licensed or registered to legally practice veterinary medicine; however, these para-professionals, including veterinary technicians or nurses, fisheries biologists, academicians and other research scientists, provide important and vital laboratory, and other supportive services required by veterinarians - WR DeHaven & AD Scarfe (2013). Professional education and aquatic animal health – A focus on aquatic veterinarians and veterinary para-professionals. *In Proc. OIE Global Conference on Aquatic Animal Health Programmes. Panama, 28–30 June 2011. World Organisation for Animal Health (OIE), Paris (In press)*

See website article:

[http://www.worldvet.org/sites/worldvet.org/files/WVA\\_WAVMA\\_draft\\_Joint\\_position\\_on\\_Aquatic\\_Vet\\_Med.pdf](http://www.worldvet.org/sites/worldvet.org/files/WVA_WAVMA_draft_Joint_position_on_Aquatic_Vet_Med.pdf)

# THE AQUATIC VETERINARIAN

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## U.S. Leads Efforts to Protect Freshwater Turtles and Tortoises at CITES Meeting

(Bangkok, Thailand—8 March 2013)

Several United States proposals to increase protections for freshwater turtles and tortoises under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) have been adopted today by member nations of the Treaty. CITES member nations, voted to increase protections for 44 species of Asian freshwater turtles and tortoises and three species of North American pond turtles.

"We are extremely heartened by today's vote to give greater protection to these highly imperiled species," said Bryan Arroyo, head of the U.S. delegation to the CITES 16th Meeting. "More than half of the world's freshwater turtles are threatened with extinction, yet they continue to be traded, unsustainably, for food, as pets, and in traditional medicines. We've taken a significant step forward today to begin managing that trade."

The United States jointly submitted with China two proposals to increase CITES protection for a number of Asian softshell and hardshell turtle species. These proposals were agreed by consensus with strong support voiced by range states, Thailand, Japan, India, Pakistan, Liberia, Indonesia, and non-range states, Guinea and Paraguay.

Proposals to transfer species from Appendix II to Appendix I were also agreed by consensus—a proposal for big-headed turtles, and a proposal for Burmese star tortoise. A proposal for the Roti Island snake-necked turtle was agreed by consensus, with a zero export quota in wild specimens—effectively banning international trade in turtles taken from the wild.

"Freshwater turtles worldwide are in desperate need of conservation, and the outlook for Asian turtles is especially grim. We are committed to working with China and Viet Nam and other CITES member nations to ensure the survival of these species," said Arroyo.

As Asian species have become increasingly depleted, trade patterns are shifting to species native to the United States. To address this growing problem, the United States proposed to list three native turtle species—the diamondback terrapin, spotted turtle, and Blanding's turtle—in CITES Appendix II to manage the trade in a legal and sustainable manner.

Turtles are in serious trouble around the world. Increasingly, freshwater turtles are in danger, with over half of the world's species threatened with extinction. Tortoises and freshwater turtles are the most threatened of any major group of terrestrial vertebrates – more than mammals, birds, or amphibians. They are used for food, pets, and traditional medicine. Eggs, juveniles, adults, and body parts are all exploited with little regard for sustainability. In Asia, turtles are used primarily as food and in traditional medicine, although a growing pet trade across the region impacts a number of threatened species.

"We must address this issue by taking a broad scale approach to protecting freshwater turtles and tortoises. If we fail to consider these trade patterns, we risk the depletion of turtles and tortoises one species at a time," said Arroyo.

For additional biological and trade information on freshwater turtles and tortoises, please visit <http://www.fws.gov/international/cites/cop16/turtles-and-tortoises.html>. To learn more about the Asian freshwater turtle and tortoise proposals that were submitted for consideration to CoP16, please refer to our fact sheet at <http://www.fws.gov/international/cites/cop16/cop16-asian-turtle-proposals-factsheet.pdf>.

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[chris\\_tollefson@fws.gov](mailto:chris_tollefson@fws.gov) <[mailto:chris\\_tollefson@fws.gov](mailto:chris_tollefson@fws.gov)>

# THE AQUATIC VETERINARIAN

Volume 7, Number 1 LEGISLATIVE & REGULATORY ISSUES First Quarter 2013

## Six-legged livestock: Edible insect farming, collection and marketing in Thailand

by Yupa Hanboonsong, Tasanee Jamjanya and Patrick B. Durst

The world's population is expected to surpass 9 billion by 2050. FAO estimates that global food production will need to expand by an estimated 60 percent from current levels. Meeting this massive additional demand will require concerted action on a number of fronts, including efforts to increase the production and consumption of currently under-utilized and under-appreciated foods.

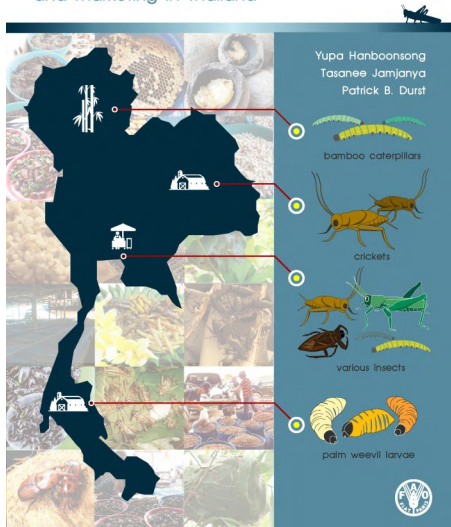
Edible insects compromise one such category. Insects offer several advantages as human food. They are extremely rich in proteins, vitamins and minerals, and at the same time are highly efficient in converting the food they eat into material that can be consumed by humans. This publication provides insight into the collection and farming, processing, marketing and trade of edible insects in Thailand – one of the few countries in the world to have developed a viable and thriving insect farming sector.

Food and Agriculture Organization of the United Nations  
Regional Office for Asia and the Pacific  
Bangkok 2013

[Download Full Report](#) 4.67 Mb

## Six-legged livestock:

edible insect farming, collecting and marketing in Thailand



[Potential new species for veterinary care, or source of food for aquaculture! - NSE]

## 66 Coral Species To Be Listed Under The US Endangered Species Act

In response to a [petition from the Center for Biological Diversity](#) to list under the ESA and designate critical habitat for these species, NMFS reviewed the status of 82 "candidate species" of corals (all petitioned species except for the Large Ivory Coral, *Oculina varicosa*). NOAA's National Marine Fisheries Service published a detailed proposal to list 12 of the coral species as "Endangered" and 54 coral species as "Threatened" under the Endangered Species Act (ESA):

- ✦ 59 in the Pacific
  - 7 would be listed as endangered
  - 52 would be listed as threatened
- ✦ 7 in the Caribbean
  - 5 would be listed as endangered
  - 2 would be listed as threatened

In addition, 2 Caribbean species--elkhorn and staghorn corals--already listed under the ESA will be reclassified from threatened to endangered.

Existing scientific studies do not provide sufficient information on coral species to predict their responses to threats. NOAA acknowledges the lack of scientific information about individual species, in both its Notice of Proposed Listing and in the underlying Status Review Report and Supplemental Information Report. Accurate identification of coral species is important because a number of studies have demonstrated that different species react differently to threats such as bleaching, disease, and ocean acidification.

Very little is known about the quantitative abundance of most of the proposed species, leading NOAA to rely on the qualitative abundance descriptions provided by the IUCN. However, these descriptions clearly indicate that species-specific data does not exist and relies on undocumented "habitat loss" as a proxy to indicate status which does not suffice to support a listing determination.

Copies of relevant documents can be found at:  
[www.nmfs.noaa.gov/pr/species/invertebrates/corals.htm](http://www.nmfs.noaa.gov/pr/species/invertebrates/corals.htm)

[www.nmfs.noaa.gov/stories/2012/11/82corals.html](http://www.nmfs.noaa.gov/stories/2012/11/82corals.html)



# THE AQUATIC VETERINARIAN

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## **Guyana seeks to expand aquaculture**

February 11, 2013

Georgetown, Guyana -- The Ministry of Agriculture is seeking to develop the necessary framework for Guyana to tap into the growing trade in aquaculture products that would entail putting the regulations in place to meet the export standards, and getting the farmers on-board.

Minister of Agriculture Dr Leslie Ramsammy met with farmers involved in aqua-farming at the Guyana School of Agriculture (GSA) to listen to recommendations for moving forward the industry and developing instead a "high yielding aquaculture industry in Guyana that can enter the Caribbean, North America and European market." "Clearly we have the potential for a very successful fishing industry, we have the potential for fishing to become more significant in the agriculture production of our country, and in contributing to overall development and the overall GDP of Guyana, but for one reason or another our development has not been as rapid as we would have preferred," he said.

Ramsammy explained that the leading producers of aquaculture are now using a lot of their own products internally, but if production is increased Guyana can seek to get a foot hold in the export market. He further explained though that in seeking to enter these markets Guyana must first meet the non-tariff and sanitary standards for export trade to these countries. "The US imports some \$1billion in aquaculture products, and Central America is now getting much attention from the US and that includes Belize, but whilst it is part of the supply chain for the US, Belize has only approximately eight acres of aquaculture pond producing tilapias yet Belize's export is many times that of any other Caribbean country."

One of the reasons is that Belize has developed all of the sanitary and phyto-sanitary standards that are necessary for exports into the US and into Europe which Guyana will have to match, he said.

In working to ensuring Guyana adheres to these international guidelines for export of aquaculture products, the Ministry of Agriculture is soon to put a number of regulatory measures in place, Ramsammy said. "We are about to approve the national policy for inland fishing and aquaculture and at present we are finalising the fishery product regulation; the marine fishing regulation and the aquaculture regulation," he said.

## **2013 AVMA Guidelines for Euthanasia**

The AVMA is pleased to announce that the revised 2013 Edition of the AVMA Guidelines for the Euthanasia of Animals is now available on the AVMA website, together with the Executive Summary. You can access both at the following link: <https://www.avma.org/KB/Policies/Pages/Euthanasia-Guidelines.aspx>.

The AVMA Guidelines for the Euthanasia of Animals are intended for use by members of the veterinary profession who carry out or oversee the euthanasia of animals. The overriding commitment of these Guidelines is to provide veterinarians guidance in relieving pain and suffering of animals that are to be euthanized.

In addition to expanded information on species-specific euthanasia methods, the latest edition of the Guidelines includes:

- Euthanasia methods for invertebrates and other lower-order species;
- Advice on humane handling of animals before and during euthanasia;
- Information on collection of animals for scientific investigations, handling injured wild animals, and removal of animals causing property damage or threatening human safety;
- Additional information about confirmation of death and disposal of animal remains; and
- Flowcharts, illustrations, tables and appendices that clarify recommendations.

Thanks to Roy Yanong, VMD (Leader for the Aquatics Working Group); Craig Harms, DVM, PhD, DACZM; Helen Roberts, DVM; Nick Saint-Erne, DVM; and Michael Stoskopf, DVM, PhD, DACZM, the 2013 revision of the AVMA Guidelines for the Euthanasia of Animals is an aquatic friendly document, with a complete chapter on the euthanasia of Finfish and Aquatic Invertebrates.

The AVMA Guidelines for the Euthanasia of Animals: 2013 Edition is also available as a [free download from Smashwords](#) in a number of formats compatible with e-readers.

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## **AppliFish, marine knowledge of over 550 marine species at the touch of a button**



With *AppliFish* consumers can choose fish that are not endangered

**12 March 2013, Rome** - You want to know more about the fish you are eating or going to buy? Is it maybe an endangered species? *AppliFish* will tell you. This free mobile application developed by the fisheries and biodiversity knowledge platform *iMarine* makes aquatic-related information available to anyone, anytime, anywhere.

While human consumption of fish products has doubled in the last half century, policies for sustainable use of aquatic ecosystems must address the challenges facing global fish stocks. Some 30 per cent of the world's marine fish stocks assessed in 2009 were overexploited, according to FAO's *State of World Fisheries and Aquaculture 2012*.

"With *AppliFish*, consumers can choose fish that's not endangered, helping ensure that there will be enough for future generations," says FAO's Marc Taconet, Senior Fishery Information Officer and chair of the *iMarine* board. "Consumers can also use the application to learn more about species, capture levels and habitats, as well as the level of threats faced by these species."

*iMarine* is a global consortium of 13 research institutes, universities and international organizations from three continents with €5 million in funding by the European Union (EU). Its new application *AppliFish* also has a web version that contains additional scientific information, which can help policymakers, producers and consumers make informed decisions, and contribute to shape policies necessary for the responsible management of fisheries and conservation of aquatic resources, as underlined in the principles laid out in FAO's *Code of Conduct for Responsible Fisheries*.

*AppliFish* adds on to *iMarine*'s applications for managing, processing and visualizing scientific content to increase awareness of the challenges which aquatic ecosystems face. These applications include the biodiversity mapping tool *AquaMaps*, the Vessel Transmitted Information Tool (VTI), reporting on vessel activity and environmental conditions for scientists working in fisheries, and the Integrated Capture Information System (ICIS), providing regional and global information on capture of aquatic species.

*AppliFish* was awarded a prize at the 10th e-Infrastructure Concertation Meeting to discuss the present and future of the EU's research and innovation policy, held in Brussels on 6-7 March. The application is designed as a pocket book of marine knowledge at the touch of a button. It offers basic information of over 550 marine species, such as a common names and sizes, distribution maps, as well as maps featuring expected changes in species distribution caused by climate change.

*AppliFish* combines data from authoritative, international sources, including FAO-FishFinder, FAO statistics, WoRMS, Fishbase, SeaLifeBase, IUCN, *AquaMaps* and OBIS, bringing together a wealth of expertise to create a community of practice in support of the ecosystem approach to fisheries management and conservation of marine living resources. *AppliFish* is available both for Android and for iOS.

So how can you play your part? Download *AppliFish* now and use it as a pocket-sized tool whenever you are at a fish market, restaurant or having dinner with friends. *AppliFish* will tell you what fish you are eating, whether it comes from a sustainable source or protected area. You can also use it to see forecasts of species distribution in the years to come. *AppliFish* is available both for **Android**: <https://play.google.com/store/search?q=applifish> and **iOS**: <https://itunes.apple.com/ca/app/applifish/id593857305?mt=8&ign-mpt=uo%3D2>.

**Subscribe to the *iMarine* monthly newsletter** for updates on *AppliFish* and learn about the *iMarine* data management services.

See original article at:

<http://www.fao.org/news/story/en/item/171646/icode/>

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## MEETINGS OF INTEREST TO AQUATIC VETERINARIANS

Veterinarians attending these meetings may be awarded veterinary CEPD credit towards annual re-licensure or re-registration to practice veterinary medicine. Individuals should check with the organizers if CEPD certificates are provided.

### 38<sup>th</sup> Eastern Fish Health Workshop

**April 29 – May 3, 2013**

Eisenhower Inn and Conference Center  
Gettysburg, Pennsylvania

#### Important Due Dates:

General Session Titles: Currently accepting  
Abstract: due by 21 March 2013  
Early Registration: until 29 March 2013 (\$225)  
Late Registration: after 29 March (\$250)  
Hotel Reservation: due by 29 March 2013  
Presentations: due by 15 April 2013

Lodging Accommodations must be made with The Eisenhower Inn and Conference Center at (717) 334-8121. You must identify your affiliation with the Eastern Fish Health Workshop and call before 29 March 2007 to secure a room at the convention rate (\$98.00 per night plus tax).

For more information, contact:

Rocco C. Cipriano  
National Fish Health Research Laboratory  
USGS/Leetown Science Center  
11649 Leetown Road  
Kearneysville, WV 25430  
P: 304-724-4432  
F: 304-724-4435  
E: [rcipriano@usgs.gov](mailto:rcipriano@usgs.gov)

### **Aquatic Animal Health in a Changing World**

44th Annual Conference of the International Association for Aquatic Animal Medicine.

**April 21-26 2013**

Sausalito, California, USA.

Website: [www.iaaam.org](http://www.iaaam.org)

### **International Conference on Diseases of Zoo and Wild Animals 2013**

**8-11 May 2013**

Vienna, Austria

Please register at [www.bayceer.uni-bayreuth.de/zoovet2013/](http://www.bayceer.uni-bayreuth.de/zoovet2013/) or follow the links at the conference website: <http://www.zoovet-conference.org/>. After registration, you will receive an e-mail confirmation.

If you would like to actively participate in the conference by an oral or poster contribution, we are looking forward to receive your abstract/manuscript by the 31st of January 2013. Further information can be found [here](#).

The following seven workshops will be held at the International Conference on Diseases of Zoo and Wild Animals 2013. Please find further information on these workshops [here](#).

- Emergency evacuation anaesthesia
- Expeditionary wildlife capture and telemetry
- Scientific writing
- Animal training
- ACZM / ECZM - short course
- Field necropsy and sampling
- Media training for zoo veterinarians

Please note that workshop places are limited, so if you would like to attend one of these workshops, we recommend registering as soon as possible!

At next year's conference, the fourth "Rudolf Ippen Young Scientist Award" will be awarded. The Award will honour a young scientist whose scientific output, particularly the papers published in the past 12 months, document the beginning of a promising career in wildlife veterinary science, conservation medicine, or zoo animal medicine.

Further information can be found [here](#).

Hotels in Vienna can be well booked, we would like to remind you to make your hotel reservation as soon as possible. A list of recommended hotels can be found [here](#).

#### THE ORGANISING COMMITTEE:

Tiergarten Schönbrunn: Thomas Voracek, Hanna Vielgrader, Claudia Slond, Dagmar Schratler  
EAZWV: Gerry M. Dorrestein, Christian Wenker, Alexis Lécu; IZW: Alex D. Greenwood, Gudrun Wibbelt, Anke Schumann, Steven Seet, Dagmar Boras, Heribert Hofer

Email: [2013@zoovet-conference.org](mailto:2013@zoovet-conference.org)

Website: [www.zoovet-conference.org](http://www.zoovet-conference.org)



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## 1st International Conference on Avian, Herpetological and Exotic Mammal Medicine 20-26 Apr 2013

Wiesbaden, Germany

The "1st International Conference on Avian, Herpetological and Exotic Mammal Medicine" (ICARE 2013) is the largest and multifaceted conference on the latest developments in veterinary care, husbandry and reproduction of exotic pets in Europe.

The international associations in avian (EAAV = European Committee of the Association of Avian Veterinarians), herpetological (ARAV = Association of Reptilian and Amphibian Veterinarians) and exotic mammal medicine (AEMV = Association of Exotic Mammal Veterinarians) and the European College of Zoological Medicine (ECZM) are joining together for the first time for a conference on all aspects of exotic animal medicine.

For further information please visit:

[www.icare2013.eu](http://www.icare2013.eu)

<http://www.icare2013.eu/index.php?id=143>

### 1<sup>st</sup> International Conference on Avian, Herpetological and Exotic Mammal Medicine



(12<sup>th</sup> European AAV Conference,  
2<sup>nd</sup> International ARAV Conference,  
1<sup>st</sup> International AEMV Conference  
and 2<sup>nd</sup> ECZM Scientific Meeting)

April 20-26, 2013  
Wiesbaden, Germany

## Caring for health and welfare of fish: A critical success factor for aquaculture 16 -17 May 2013

International Auditorium, Boulevard Roi Albert II 5,  
Brussels, Belgium

The Federation of Veterinarians of Europe (FVE) in association with the Irish presidency of the Council of the EU and the support of EU Commission organises this Conference in Brussels. The conference aims at bringing together the different stakeholders in the field of aquaculture. The purpose of this event is:

- to review the current situation in the EU and
- to identify animal health and welfare, public health and environmental issues that need to be addressed
- to look into the role of the veterinary profession in assuring these matters.

Please mark your calendar and save the date!  
We look forward to welcoming you in Brussels!

Kind regards,

**Despoina Iatridou, DVM**

Veterinary Policy Officer  
Federation of Veterinarians  
of Europe (FVE)

Avenue de Tervuren 12  
B-1040 Brussels

Tel: +32 (0) 2 533 70 20

Fax: +32 (0) 2 537 28 28



## Conservation Medicine and Diseases of Amphibians and Reptiles 23-29 June 2013

AMNH Southwest Research Station, Arizona

Web link:

<http://research.amnh.org/swrs/conservation-medicine-and-diseases-amphibians-and-reptiles>

## AVMA Convention Aquatic Veterinary Sessions July 20-23, 2013

Chicago, IL, USA

[www.avmaconvention.org](http://www.avmaconvention.org)

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## 2013 AQUAVET® I & II & III

The University of Pennsylvania School of Veterinary Medicine and the College of Veterinary Medicine at Cornell University are pleased to announce the 2013 AQUAVET® I & II Programs as well as the new AQUAVET® III offering. They are aquatic veterinary medicine education programs that currently consist of two courses that will be presented at Roger Williams University in Bristol, RI in June 2013 and one on aquarium medicine which is at three venues.

**AQUAVET® I: An Introduction to Aquatic Veterinary Medicine** is a 4-week course (26 May - 22 June 2013) intended primarily for veterinary students.

**AQUAVET® II: Comparative Pathology of Aquatic Animals** is a 2-week course (26 May - 8 June 2013) that is oriented toward the pathology of diseases of aquatic invertebrates and fish that are used in biomedical research, encountered in display aquaria and are of importance in commercial aquaculture.

**AQUAVET® III: Clinical Aspects of Captive Aquatic Animal Medicine** is a 5 week course (24 June - 27 July, 2013) and is limited to a small number of students. The venues include GA Aquarium, U of GA and Dolphinaris, Cancún, México.

Veterinary students can receive credits for the course and graduate veterinarians can receive CE credits.

More detailed information and applications for admission (due by January 15, 2013) are available on the web site [www.aquavet.info](http://www.aquavet.info).

## 2<sup>nd</sup> Australian Scientific Conference on Aquatic Animal Health

July 8-12, 2013

Pullman Reef Hotel, Cairns, QLD

The Second Australasian Scientific Conference on Aquatic Animal Health will be held in Cairns (<http://www.pullmanhotels.com/gb/hotel-2901-pullman-reef-hotel-casino/index.shtml>), Queensland, Australia. The conference provides a forum for presentation of diagnostic, research, management and policy issues encompassing all areas of aquatic animal health and bio-security.

The FRDC Aquatic Animal Health Subprogram is pleased to announce that Prof Hugh Ferguson (Head of the Department of Pathobiology, Director of the Marine Medicine programme, Professor of Pathology, School of Veterinary Medicine, St George's University, Grenada, West Indies), and Prof Don Lightner (Aquaculture Pathology Laboratory, Department of Veterinary Science and Microbiology, University of Arizona, OIE Reference Laboratory for Crustacean Diseases) have accepted invitations as Conference Keynote Presenters.

To submit a presentation abstract, or receive further announcements and information on the program, please contact Joanne Slater (email: [joanne.slater@csiro.au](mailto:joanne.slater@csiro.au)).

## EAFP 16<sup>TH</sup> INTERNATIONAL CONFERENCE ON DISEASES AND SHELLFISH

SEPTEMBER 2-6, 2013

Tampere Finland

The 16th International Conference on Diseases of Fish and Shellfish will be held at the Tampere Hall Conference Centre in Tampere, Finland. Scientific and technical sessions consisting of invited talks, keynotes, oral presentations, poster presentations and workshops. An EAFP General Assembly will take place during the Conference. Planned social events include a Welcome Cocktail, Civic Reception and the traditional Conference Banquet.

More information will be available on the EAFP website as well. Feel free to contact our Meeting Secretary if you have any questions or need additional information.

Jose A. Garcia, EAFP Meeting Secretary, Dept. Sanidad Animal, Fac. Veterinaria, Universidad Complutense de Madrid, Avda. Puerta de Hierro s/n, 28040-Madrid, Spain. Fax: +34 (91) 394-3908. E-mail: [gcabrera@vet.ucm.es](mailto:gcabrera@vet.ucm.es).



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## Disease Diagnosis and Control in Marine Shrimp Culture

June 3-14, 2013

Sponsored by the Aquaculture Pathology Laboratory, Department of Veterinary Science and Microbiology, University of Arizona, Tucson, AZ 85721 USA.

### Registration Information:

Registration is limited to 30.

### Deposit and Early Registration Deadline:

\$100.00 (USD) by April 1, 2013.

### Mailing address:

The University of Arizona  
Department of Veterinary Science & Microbiology  
Aquaculture Pathology Laboratory  
1117 E. Lowell Street, Room 102  
Tucson, Arizona 85721 USA  
Phone: 520-621-4438  
FAX: 520-621-4899

Email: [ritar@email.arizona.edu](mailto:ritar@email.arizona.edu) or  
[dvl@email.arizona.edu](mailto:dvl@email.arizona.edu)

### Cost:

\$1,500.00 (USD) if the deposit is received on or before April 1, 2013.

\$2,000.00 (USD) if the deposit is received on or after April 2, 2013.

### Accommodations:

Both single and double rooms are available at the nearby Tucson Marriott University Park Hotel at \$75.00 (plus applicable taxes) per night for a single or double room. Dormitory rooms are available for \$31.00 per night for a single room and \$54.00 per night (\$27.00 per person) for a double room.

### International Travelers:

Due to more stringent U.S. entry requirements, allow a minimum of 4-6 months for visa processing.

### Program

**Lectures:** At least two lectures are scheduled each day. The following topics will be covered:

1. Course introduction, purpose, scope and schedule.
2. Introduction to gross anatomy and normal histology.
3. White Spot Disease (WSSV).
4. The baculovirus and baculo-like virus disease including MBV, BP and BMN.
5. Infectious hypodermal and hematopoietic necrosis virus, hepatopancreatic virus and other parvovirus caused diseases.

6. Taura syndrome, Infectious myonecrosis, Yellowhead and other RNA virus caused diseases.
7. Bacterial, rickettsial and fungal diseases.
8. Surface fouling diseases.
9. Nutritional diseases.
10. Toxic and environmental disease syndromes.
11. Diseases of unknown or uncertain etiologies.
12. Parasitic diseases.
13. Methods of disease prevention and/or treatment.
14. New diagnostic procedures.

**Labs and Demonstrations:** Two lab sessions per day. Topics to be covered in the labs include:

1. Fixation procedures for routine histology.
2. Standard histological techniques.
3. Normal histology and post-mortem change of principal organs and tissues.
4. Wet mount diagnostic procedures.
5. PCR/RT-PCR and gene probes for diagnosis of viral diseases.
6. Antibody-based methods for diagnosis of viral and/or bacterial diseases.
7. Isolation, culture, identification and antibiotic sensitivity of bacterial isolates.
8. Histopathology of viral, bacterial, rickettsial, fouling, parasitic, toxic and nutritional diseases.

### University Graduate Course Credit:

Three graduate credits are available for VSC565 (US residents only) through The University of Arizona Summer Session.

### Lectures, Labs and Demonstrations:

By Staff from the Department of Veterinary Science and Microbiology

D.V. Lightner, Ph.D.: Professor, Specialist in diseases of cultured shrimp

C.R. Pantoja, Ph.D.: Associate Research Professor, Shrimp Pathologist

K.Tang-Nelson, Ph.D.: Associate Research Professor, Molecular Virologist

L.L. Mohny, M.S.: Microbiologist

L.M. Nunan, M.L.A.: Molecular Biologist

S.A. Navarro, B.S.: PCR techniques, Microbiologist

R.M. Redman, H.T.: Histotechnologist

### Need more information?

Contact Rita Redman or Dr. Donald Lightner:

The University of Arizona

Department of Veterinary Science & Microbiology  
Aquaculture Pathology Laboratory

1117 E. Lowell Street, Room 102

Tucson, Arizona 85721 USA

Phone: 520-621-4438; FAX: 520-621-4899

Email: [ritar@email.arizona.edu](mailto:ritar@email.arizona.edu)



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## 54TH WESTERN FISH DISEASE WORKSHOP AND AFS FISH HEALTH SECTION MEETING

June 18-20, 2013

Port Townsend, Washington

We are pleased to announce the 2013 Western Fish Disease Workshop and Annual Meeting of the AFS Fish Health Section in Port Townsend, WA from June 18-20, 2013.

Port Townsend (population 9,000) is a beautiful Victorian seaport, located on the northwest shore of Puget Sound, only a 2 hour drive from Seattle and SeaTac airport.

The meeting will be held at the newly constructed Northwest Maritime Center, with spectacular views of Port Townsend Bay and the Strait of Juan de Fuca. Information on registration, abstract submission, and lodging options will be available in early 2013.

For more information, please contact Paul Hershberger ([phershberger@usgs.gov](mailto:phershberger@usgs.gov)) or Jake Gregg ([jgregg@usgs.gov](mailto:jgregg@usgs.gov)).

## FIRST FISH AND SHELLFISH IMMUNOLOGY CONFERENCE

June 25 to 28, 2013

Vigo, Spain

We invite you to come and share the latest and more important findings regarding the immunology of the aquatic organisms with the most relevant researchers of the field.

This conference derives from the *Nordic Organization of Fish Immunology* (NOFFI) conference, which in 2007 changed its name to *European Organization of Fish Immunology* (EOFFI) to extend its activities to other countries besides the Nordic territory. In Viterbo, Italy (2010), it was decided to establish a new *International Society of Fish and Shellfish Immunology* (ISFSI). In this new Society, the immunology of shellfish is now considered for the first time and the conference is open to researchers working in fish and shellfish immunology from all over the world. Furthermore, a special issue of *Fish and Shellfish Immunology* will be published with abstracts presented at the Conference.

Early registration: Before April 15<sup>th</sup> 2013.

Organizing Committee:

Beatriz Novoa, Sonia Dios, Amparo Estepa, José Leiro, David Posada, Antonio Figueras.

Website: <http://vigoimmunology.com/2013/>

## 2013 SALMON DISEASE WORKSHOP

July, 2013 (dates to be decided)

Corvallis, Oregon

This workshop is designed for professionals working in the fish health field and will emphasize recent advances and developments in our understanding of salmonid diseases. The workshop is limited to 20 participants on a first come, first served basis.

For more information, if you wish to receive graduate credit and to register, please contact Dr. Jerri Bartholomew at 541-737-1856 or e-mail at: [bartholj@science.oregonstate.edu](mailto:bartholj@science.oregonstate.edu) A website for more information and with links to registration will be posted in the near future.



## AFS 2013 Little Rock:

### Preparing for the Challenges Ahead

September 8–12, 2013

Little Rock, Arkansas

Begin making plans to attend the AFS 143rd Annual Meeting, themed "Preparing for the Challenges Ahead," in Little Rock, Arkansas on September 8–12, 2013.

Contributed paper and poster abstracts are due by March 15, 2013.

Details will be found at:

[www.afs2013.com/call-for-papers](http://www.afs2013.com/call-for-papers).

Meeting details and registration will be found at:

[www.afs2013.com](http://www.afs2013.com).

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## 31st World Veterinary Congress

17–20 September 2013

Prague, Czech Republic

150th Anniversary of the World Veterinary Association

Detailed program, abstract submission form as well as information about registration, social events etc. are available on the website:

[www.wvc2013.com](http://www.wvc2013.com)

We look forward to meeting you in Prague in 2013



WORLD VETERINARY  
ASSOCIATION

## 2014 INTERNATIONAL SYMPOSIUM ON AQUATIC ANIMAL HEALTH

Aug 31 – Sept 4, 2014

Portland, Oregon

I am pleased to announce that this meeting will be held in Oregon! Late summer is a beautiful time to be here and Portland is a wonderful city with lots to offer.

Stay tuned for details as meeting planning progresses. I do promise a great venue and fun events – of course the scientific program will be outstanding.



## 39th World Small Animal Veterinary Association Congress

16-19 September, 2014

Cape Town, South Africa.

Abstract Submission Opens: November 1, 2013

<http://www2.kenes.com/wsava/pages/home.aspx>

Join us for both the stimulating sessions and the special flavor of Cape Town, a city filled with unique flora and surrounded by beautiful beaches, vineyards and natural beauty.

Cape Town is one of the world's most stunning locations, and is a popular tourist destination filled with natural beauty and a rich variety of stimulating activities. Safari adventures depart regularly from the area.

**Kevin Stevens**

Local Host Chairman



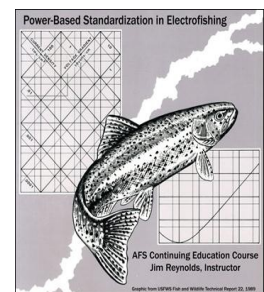
## Standard Methods for Sampling North American Freshwater Fish

May 22<sup>nd</sup>, 2013

12:00pm – 4:00pm ET USA

(9:00am – 1:00pm PT)

Online Webinar



This FREE half-day webinar will be presented in three 70-minute sessions with two intervening 15-minute breaks. Basic electrical principles, including power transfer, will be covered in the Session 1; elements of power-based standardization in Session 2; and development of standardized power procedures in Session 3.

To register, please visit:

<https://attendee.gotowebinar.com/register/3114828830178489088>

# THE AQUATIC VETERINARIAN

Volume 7, Number 1    EXTERNSHIPS, INTERNSHIPS & RESIDENCIES    First Quarter 2013

## SeaWorld (3-4 weeks)

SeaWorld offers externships at each of its 3 locations. There is one common application where you rank each park. Externs get to work with the wild birds that are brought for rehabilitation, even surgery! You are required to give a small presentation to the veterinary staff on the last week of your rotation. Housing is not provided, but there are lots of hotels in the area, including an extended stay hotel with a small kitchenette for around \$50/night.

## The Marine Mammal Center (3-4 weeks)

Located in Sausalito, CA, the Marine Mammal Center is in the front-running for marine mammal rehabilitation and research. It is very seasonal, with more animals in the spring and summer. You will work with the veterinary staff 3-4 days per week, and then on crew, doing basic husbandry and feeding once or twice a week. Housing is provided with the veterinary intern and any other externs at one of the old fort houses nearby. It is highly recommended that you get a car for driving around. It is a beautiful area with lots of beach coast and hiking.

## Mystic Aquarium

Mystic Aquarium in Mystic, CT, right near the coastal Rhode Island border, houses a large collection of marine mammals, fish and invertebrates. You work primarily with the veterinary intern, shadowing and assisting on procedures. You will also get very proficient in taking and processing analog radiographs. A presentation is required during this externship. No housing is provided, but you may want to ask if they know of anyone working at the aquarium who can provide you with a room for the time you are there. This is another rotation where you'll want a car to check out all the beaches nearby.

## Georgia Aquarium

Georgia Aquarium is one of the newest aquariums in the US. It has a new procedure suite and one of the most outstanding tanks in the world. Housing is not provided. You may not need a car since the aquarium is located in downtown Atlanta, GA.

## Navy Marine Mammal Program (4 weeks)

The US Navy trains marine mammals to perform tasks underwater that cannot be performed

by humans. This is a high priority for those interested in marine mammal medicine. This program is based in San Diego, CA and is highly competitive.

## Vancouver Aquarium (2-4 weeks)

Located in Stanley Park of Vancouver, Canada, Vancouver Aquarium takes externs to work with their collection of mammals, birds, amphibians, reptiles and fish. A literature review project is required. Housing is not provided but they provide a guide on their website. Make sure your passport is up to date!

## Georgia Sea Turtle Center (2-6 weeks)

The Georgia Sea Turtle Center is located on Jekyll Island along the southern coast of Georgia. They rehabilitate both sea turtles and native land turtles at their center. If turtles are your interest, this is one of the best facilities to participate in the latest research and rehabilitation techniques. A research project is required for non-4th year students that is financed by funding through your school. Housing available based on seasonality. A car is recommended.

## National Aquarium

### **Baltimore, MD (6-8 weeks)**

National Aquarium is located in Baltimore, MD and houses a large collection of fish, mammals, amphibians/reptiles and birds. This rotation gives hands-on experience with fish, birds, reptiles and amphibians. There is some work with mammals and other critters, but it is largely observational. Applications are accepted year round. A small presentation is required. No housing is available but there are lots of hotels in the area.

## New England Aquarium

### **Boston, MA (6-8 weeks)**

Located in Boston, MA, the New England Aquarium hosts a large collection of fish, birds, marine mammals and turtles. Their chief veterinarian, Dr. Charles Innis, is one of the most knowledgeable about cold stun in turtles and has made a significant contribution to researching their rehabilitation. Externs are required to prepare a case report and research paper with presentations for both. No housing is available, but there are lots of options nearby.



# THE AQUATIC VETERINARIAN

Volume 7, Number 1

JOB OPPORTUNITIES

First Quarter 2013

## **FAO Seeks Aquatic Veterinary International Expert for Aquatic Disease Emergency Preparedness and Contingency Planning**

FAO TCP/INS/3402, the development of preventive aquatic animal health protection plan and enhancing emergency response capacities to shrimp disease outbreaks in Indonesia has just been approved. We are looking for an international consultant within the following Terms of Reference:

Terms of Reference – International Expert 2 (Aquatic Disease Emergency Preparedness and Contingency Plan)

Under the operational and overall supervision of the FAOR Indonesia, the technical supervision of the Aquaculture Service (FIRA) as Lead Technical Unit (LTU), in close collaboration with the Lead Technical Officer (FAORAP) and in consultation with the National Project Coordinator (NPC), National Consultant 2 (Emergency Preparedness and Contingency Planning), National Consultant 1 (Disease Surveillance and Reporting), and National Consultant 3 (Aquatic Animal Health Information System).

The International Expert 2 on Aquatic Disease Emergency Preparedness and Contingency Plan will take a lead in implementing Output 2 (Aquatic animal emergency preparedness guidelines improved and simulation exercise initiated) and will be required to perform the following duties:

Take a lead in implementing the activities to achieve Output 2 involving the following activities:

Activity 2.1. Conduct an aquatic animal health emergency preparedness simulation exercise using experiences from terrestrial veterinary specialists

Activity 2.2. Incorporate experiences from the simulation exercise into a set of revised aquatic emergency preparedness guidelines

Activity 2.3. Hold 2 workshops to implement the above activities

Participate in relevant international/national training/workshops and contribute to the achievement of the other project outputs;

Prepare a comprehensive report containing the above and submit to FAO/FIRA in both hard

copy and electronic formats (in Microsoft Word 2007).

Qualifications:

University or related degree in veterinary medicine, aquaculture/fisheries, food safety and quality; At least 10 years of professional experience in any one or a combination of aquatic animal epidemiology; information systems, disease databases, surveillance and reporting; emergency preparedness, contingency planning, simulation exercise, preparation of guidelines. Experience with working in a participatory manner; Fluency in English, good communication and writing abilities.

Duty station: Indonesia, with domestic travels.

Duration: When actually employed basis for a total of 40 days consisting of 2 missions and 30 mission days (including travel) and 10 days desk work or work from home.

For more information, or if interested and available, please complete and sent the attached Personal History Form, and a copy of an expanded CV to:

**Melba B. Reantaso**, Ph.D.

Aquaculture Officer / Aquaculture Service (FIRA)  
Fisheries and Aquaculture Resources Use and Conservation Division (FIM)

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